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CRPL-F 243 PART A

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PART A
IONOSPHERIC DATA

ISSUED
NOVEMBER 1964

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

CRPL-F 243
PART A

NATIONAL BUREAU OF STANDARDS
CENTRAL RADIO PROPAGATION LABORATORY
BOULDER, COLORADO

Issued
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IONOSPHERIC DATA

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IONOSPHERIC DATA

The CRPL-F series bulletins are issued as part of the responsibility of the Central Radio Propagation Laboratory for the exchange and distribution of ionospheric and related geophysical data. Part A, "Ionospheric Data," and Part B, "Solar-Geophysical Data," of the CRPL-F series present a variety of data collected by CRPL in the course of its research and service activities. Through the CRPL-F series, as part of the general exchange of scientific information, these data are made available for use by others in research on radio propagation and the ionosphere, and in other geophysical applications.

In the CRPL-F series, Part A, tables of monthly median values of vertical-incidence ionospheric data are presented accompanied by graphs of critical frequencies and M(3000)F2. The tables include the number of values entering into the median determination (count). When available, the upper and lower quartile values (indicated by UQ and LQ) are listed for foF2, foF1, foEs, M(3000)F2, h'F2 and h'F. Space limitations do not permit inclusion of quartile values for the other characteristics. The tables are prepared by machine methods and the graphs are plotted automatically.

The tables and graphs present the ionospheric data as received from the originating laboratory. Responsibility for the accuracy and reliability of the data rests entirely with the originator. Medians of data for the U.S. stations are computed by CRPL in accordance with the recommendations of the World-Wide Soundings Committee.

Data will appear in the F-series, Part A, only when the complete daily-hourly tabulations have been received by the CRPL or the World Data Center A for Airglow and Ionosphere. In general, priority of publication is given to the most current data. Data received too long after the month of observation may experience an indefinitely prolonged delay before finding space in the F series, Part A.

Information on symbols, terminology and conventions may be found in the "URSI Handbook of Ionogram Interpretation and Reduction of the World-Wide Soundings Committee," edited by W. R. Piggott and K. Rawer (Elsevier, 1961), which supersedes previous documents. A list of symbols is available from CRPL on request.

Units and Abbreviations of Ionospheric Data Tables

foF2, foEs - - - Tenths of a megacycle	MED - Median
foF1, foE - - - Hundredths of a megacycle	CNT - Count
h'F2, h'F, h'E - Kilometers	UQ - Upper Quartile
M(3000)F2 - - - Hundredths	LQ - Lower Quartile

Key to Points of Ionospheric Data Graphs

foF2: x foE : ⊙ M(3000)F2 : ◇
 foF1: Δ foEs: +

< Less-than value indicated. > Greater-than value indicated.

- - - Interpolated value indicated.

The following table contains the latest available information on twelve-month smoothed average of observed Zurich relative sunspot numbers, beginning with the minimum of April 1954. Final numbers are listed through June 1963, the succeeding values being based on provisional data.

Smoothed Observed Zurich Relative Sunspot Number

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1954				3	4	4	5	7	8	8	10	12
1955	14	16	19	23	29	35	40	46	55	64	73	81
1956	89	98	109	119	127	137	146	150	151	156	160	164
1957	170	172	174	181	186	188	191	194	197	200	201	200
1958	199	201	201	197	191	187	185	185	184	182	181	180
1959	179	177	174	169	165	161	156	151	146	141	137	132
1960	129	125	122	120	117	114	109	102	98	93	88	84
1961	80	75	69	64	60	56	53	52	52	51	50	49
1962	45	42	40	39	39	38	37	35	33	31	30	30
1963	29	30	30	29	29	28	28	27	27	26	23	21
1964	19	17	15	12								

NOTICE OF CHANGE OF FORMAT

Beginning with this issue, tables and graphs of ionospheric data will appear on the same page side by side, with two station months of data summary tables and their corresponding graphs on a single page. The same number of station months of data will appear per issue. The change in proportion of the graphs permits somewhat larger printing for the tabulated data, resulting in more legible tables. We believe that most readers will also find the new arrangement more convenient to use.

THE IONOSPHERIC DATA PRESENTED IN THE 100 TABLES AND GRAPHS OF THIS ISSUE WERE ASSEMBLED BY THE CENTRAL RADIO PROPAGATION LABORATORY FOR ANALYSIS, CORRELATION, AND DISTRIBUTION. THE FOLLOWING ARE THE SOURCES OF THE DATA.

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WEAPONS RESEARCH ESTABLISHMENT, DEPARTMENT OF SUPPLY.
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DOURBES, BELGIUM

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ST. JOHNS, NEWFOUNDLAND
KENORA, CANADA

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CONCEPCION, CHILE

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TELECOMMUNICATIONS, MINISTRY OF COMMUNICATIONS,
TAIPEI, HSIAN, TAIWAN, REPUBLIC OF CHINA,
TAIPEI (TAIWAN), CHINA

INSTITUTO GEOFISICO DE LOS ANDES COLOMBIANOS.
BOGOTA, COLOMBIA

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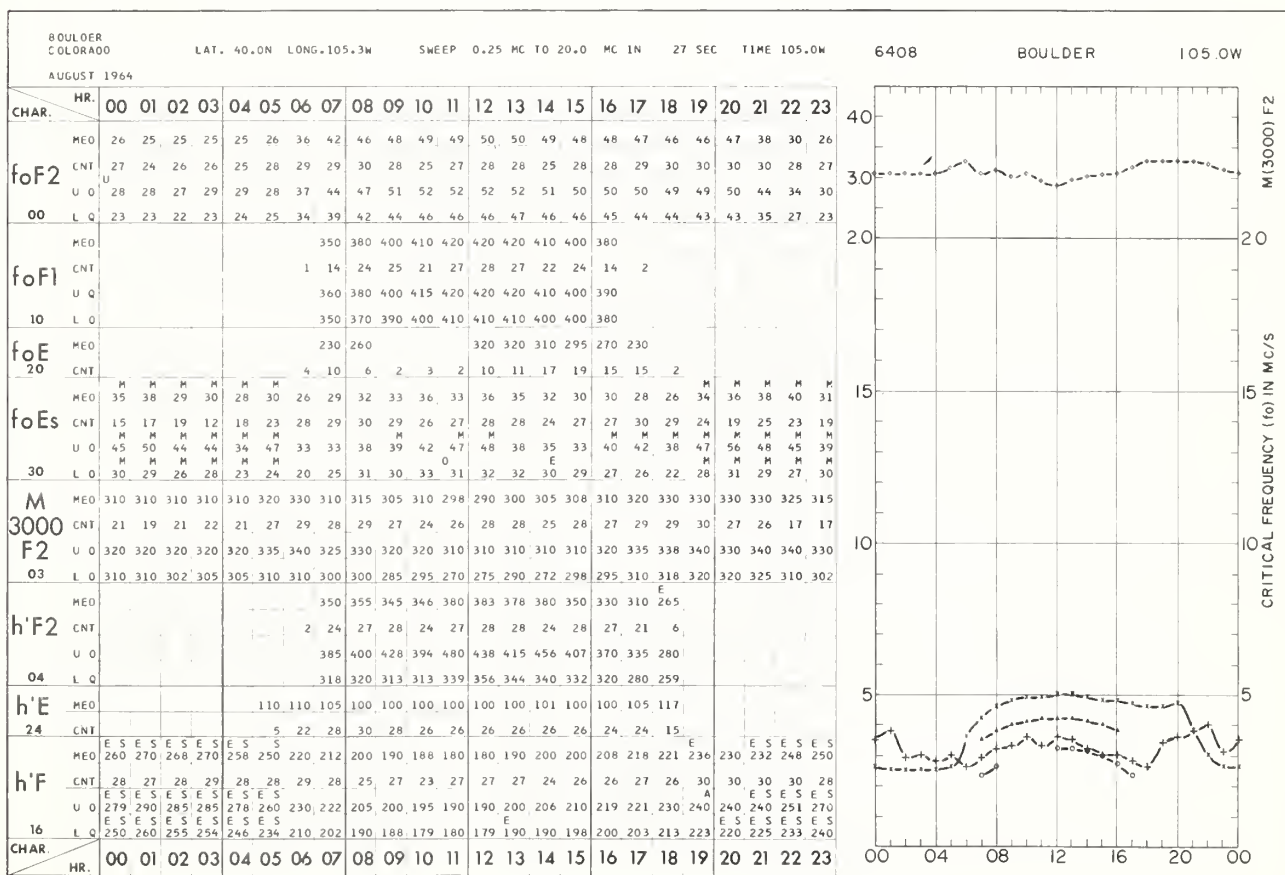
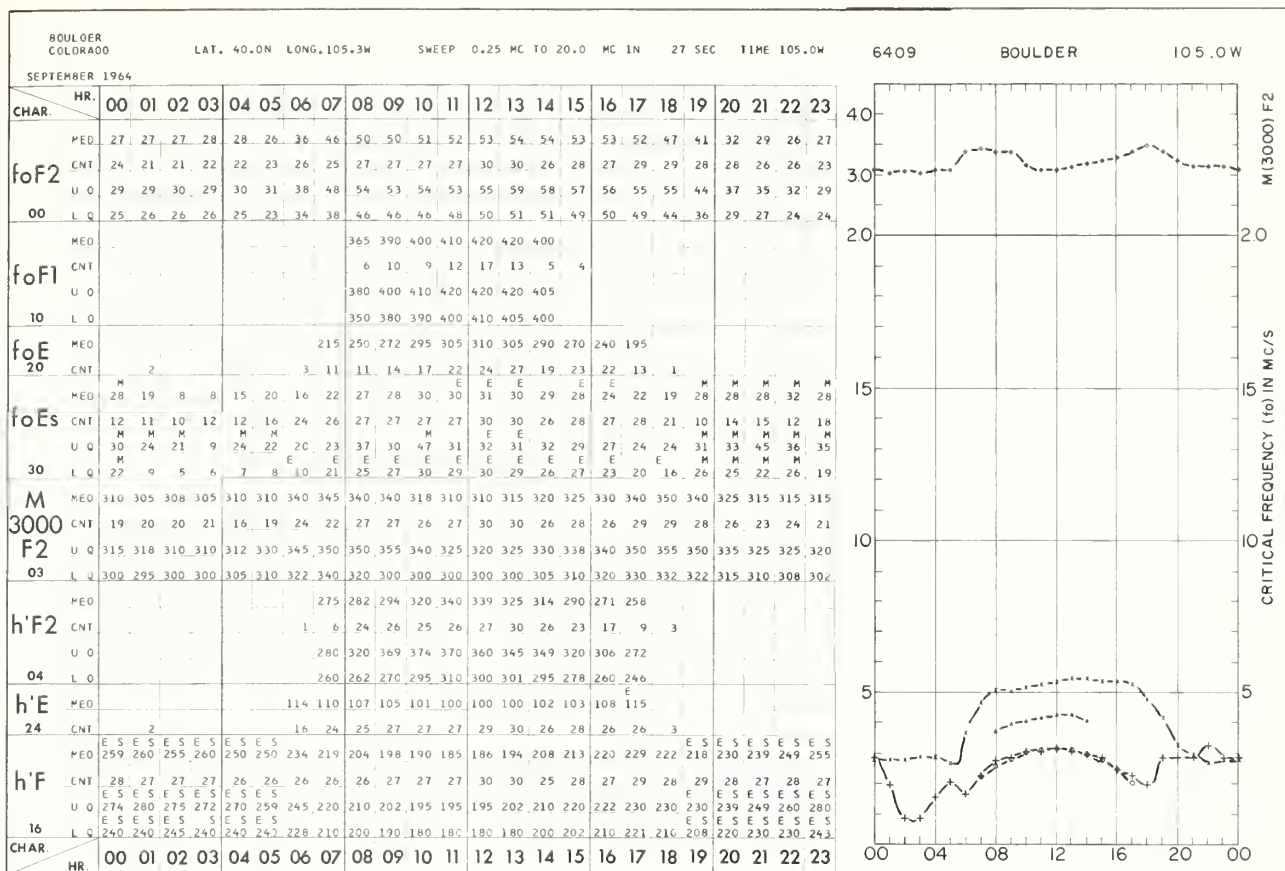
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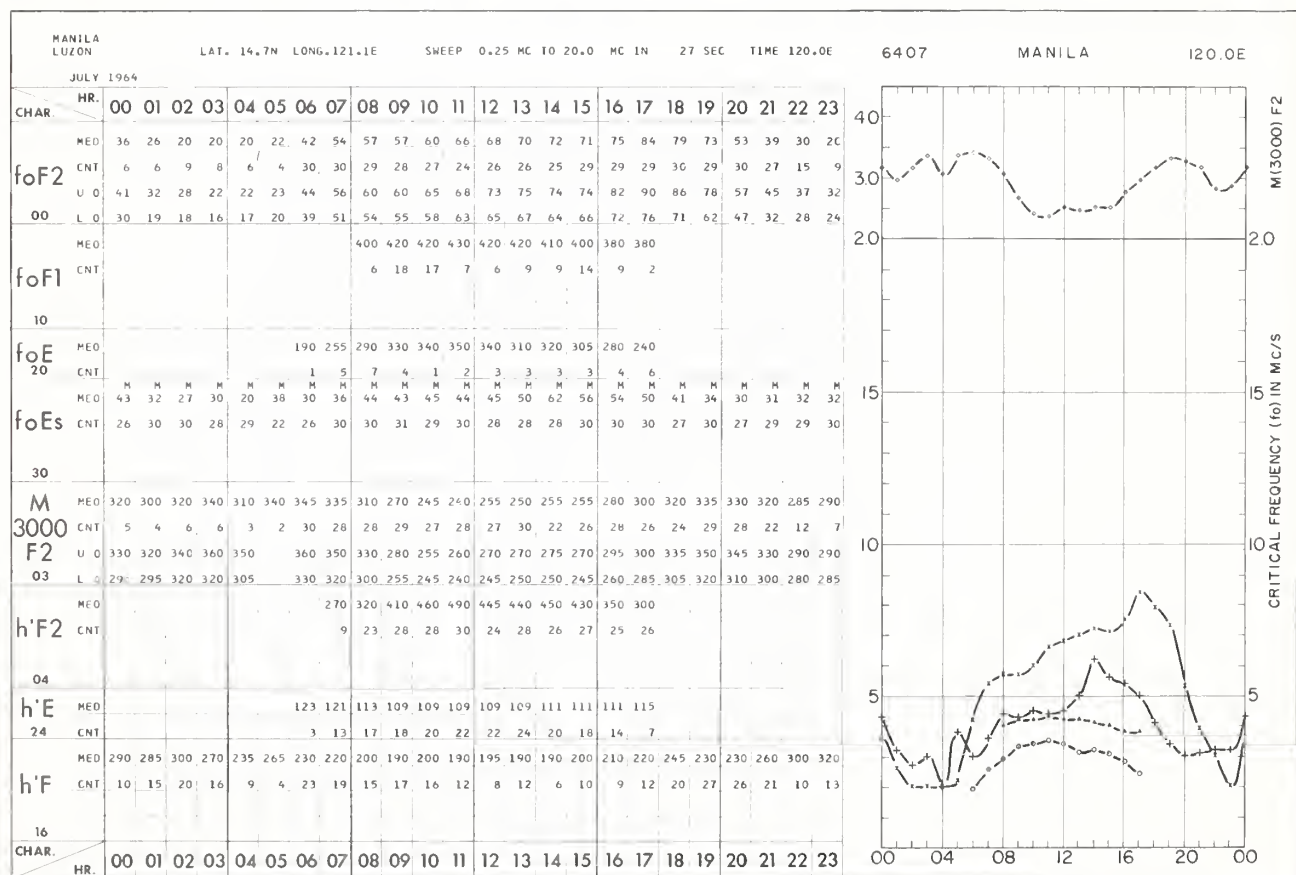
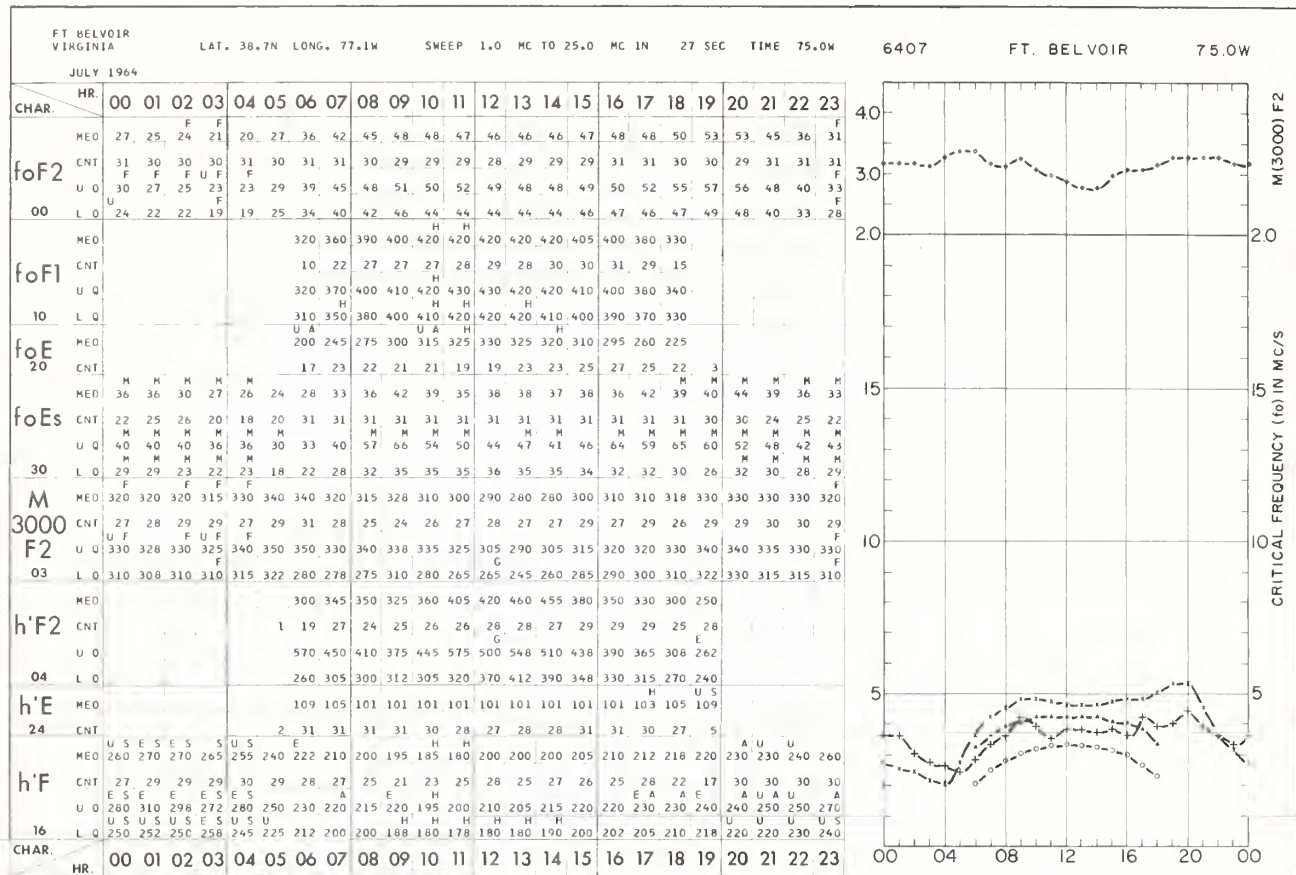
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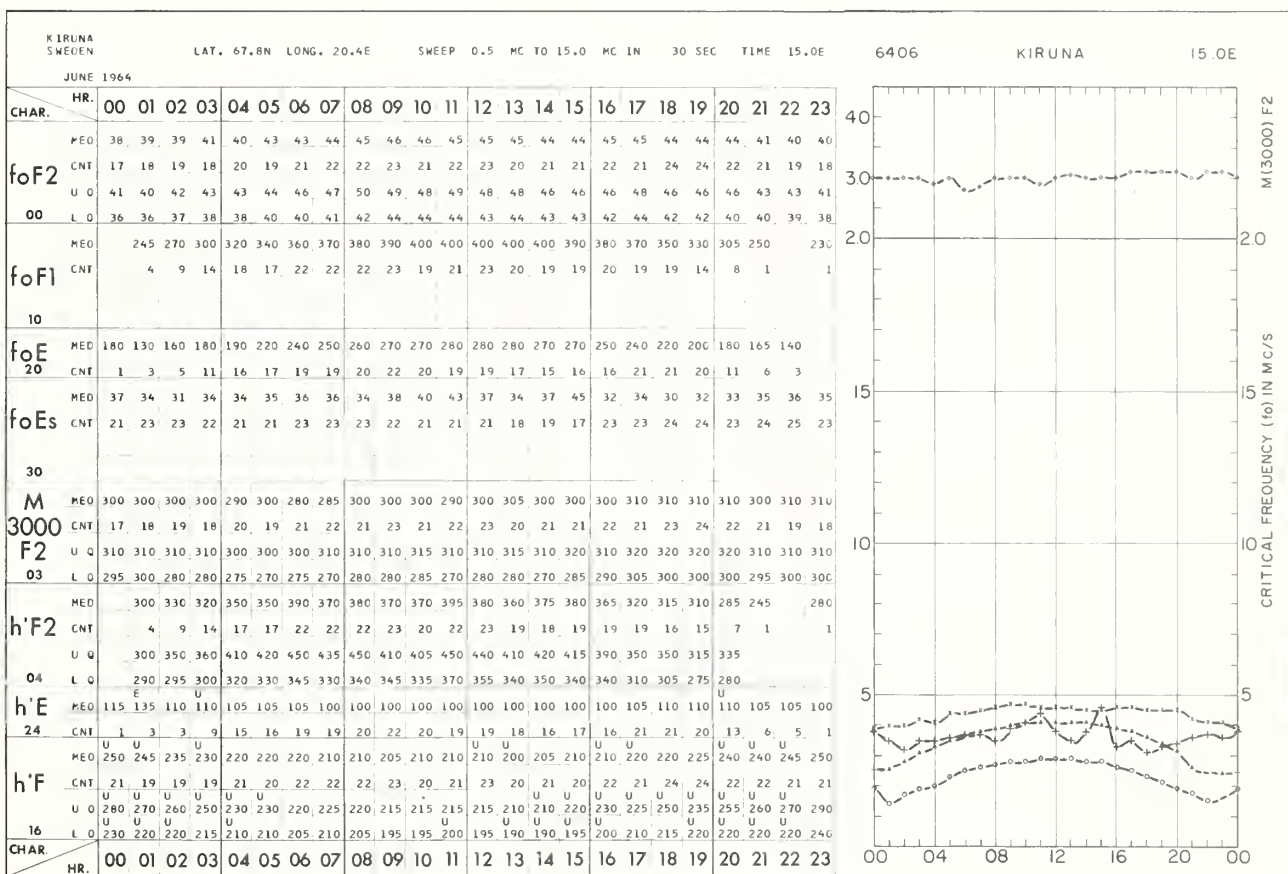
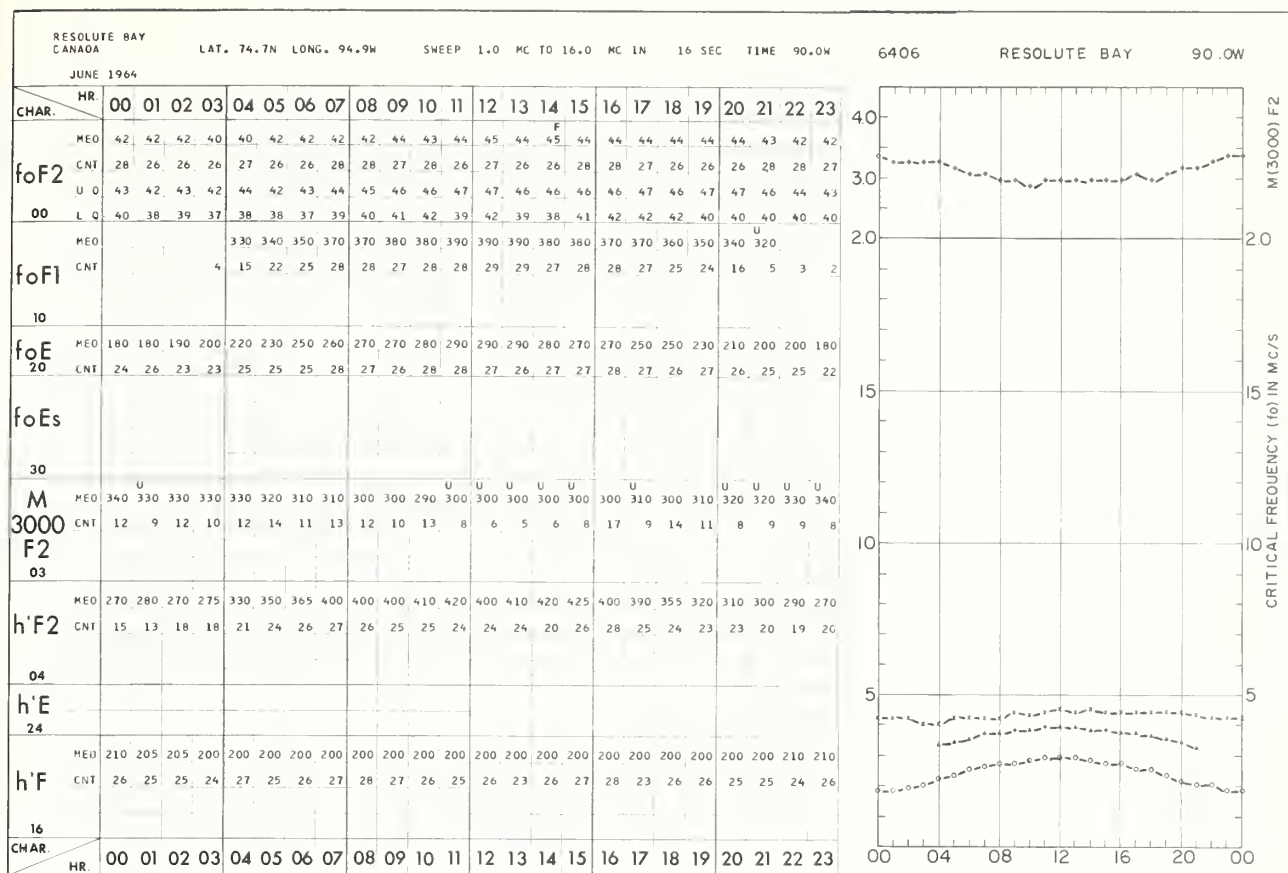
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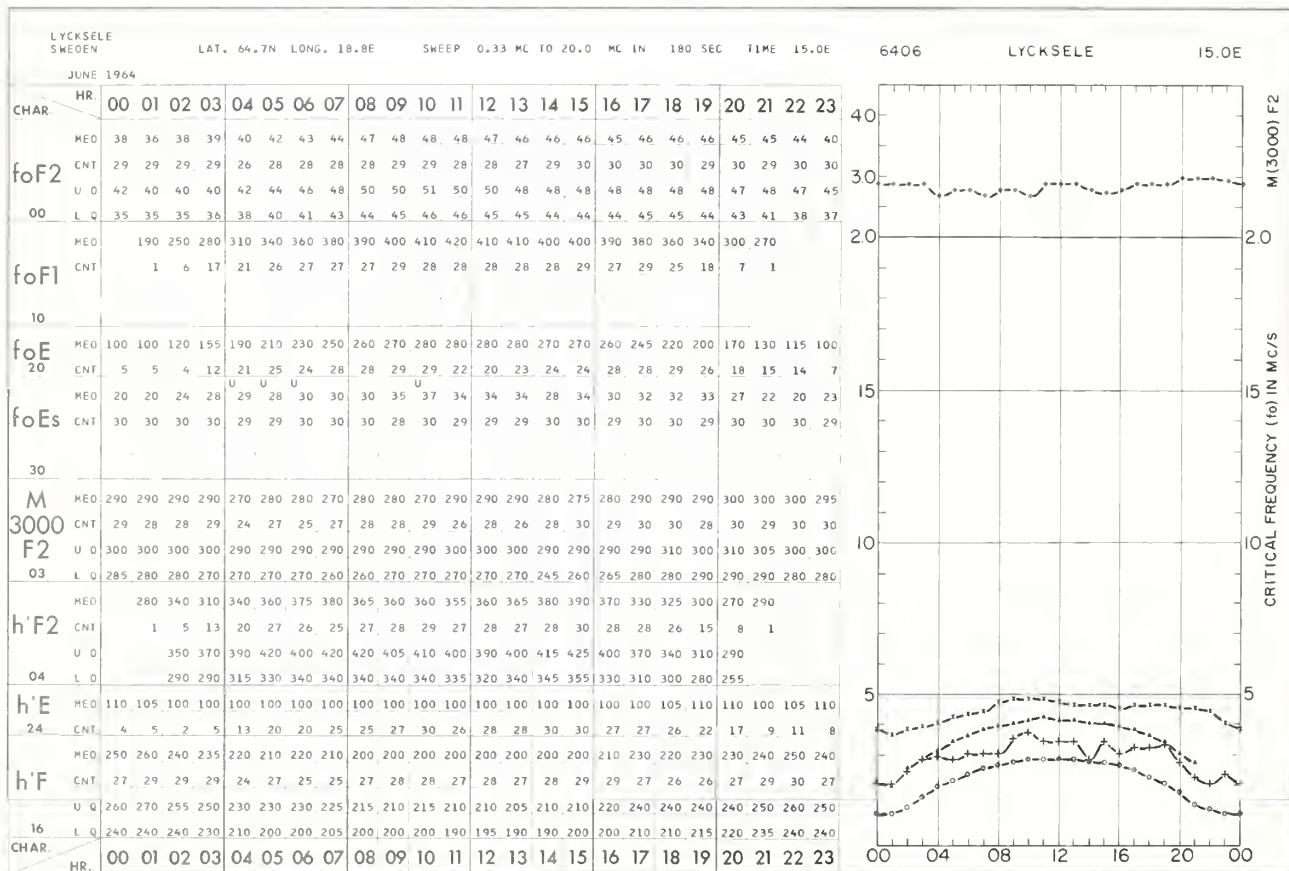
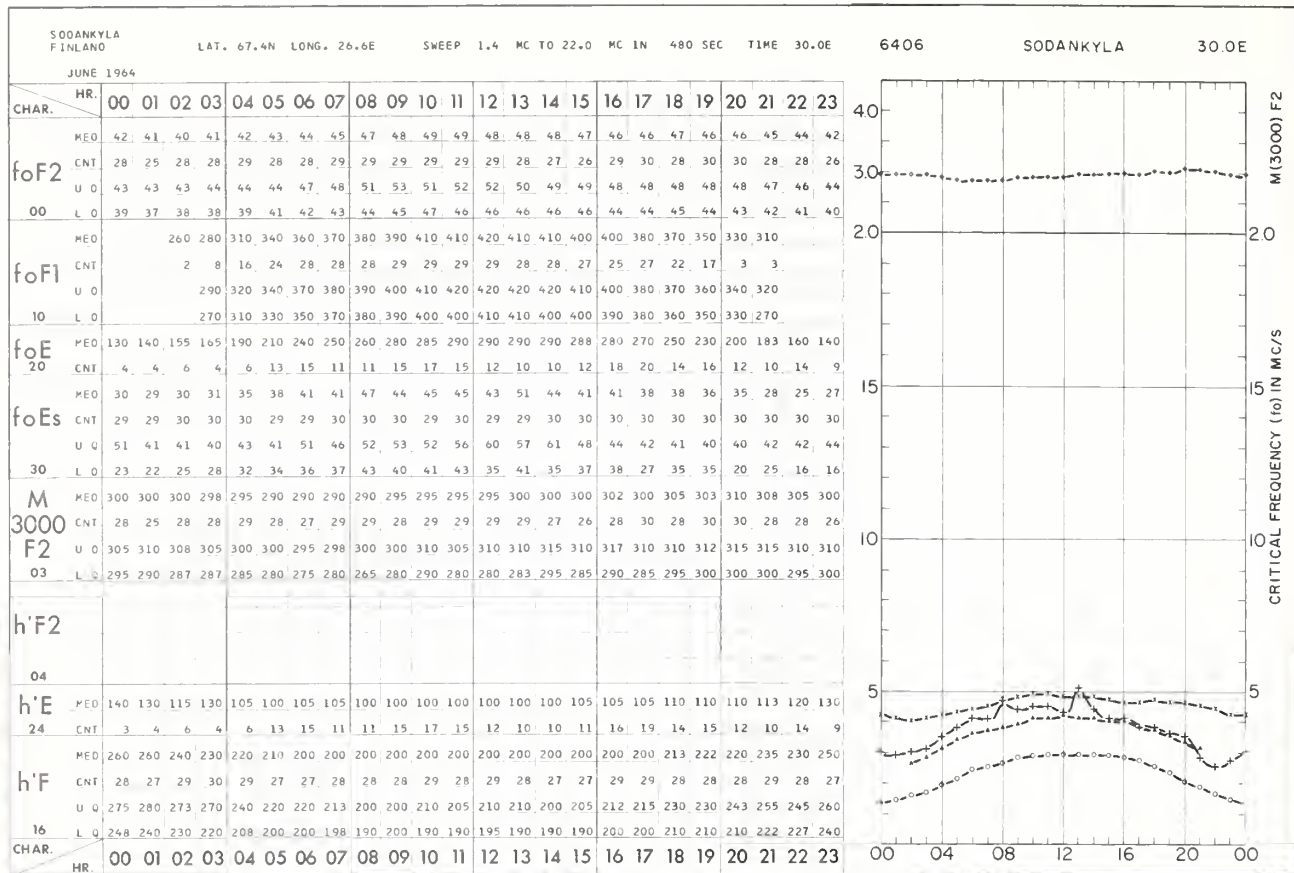
TABLES AND GRAPHS OF IONOSPHERIC DATA

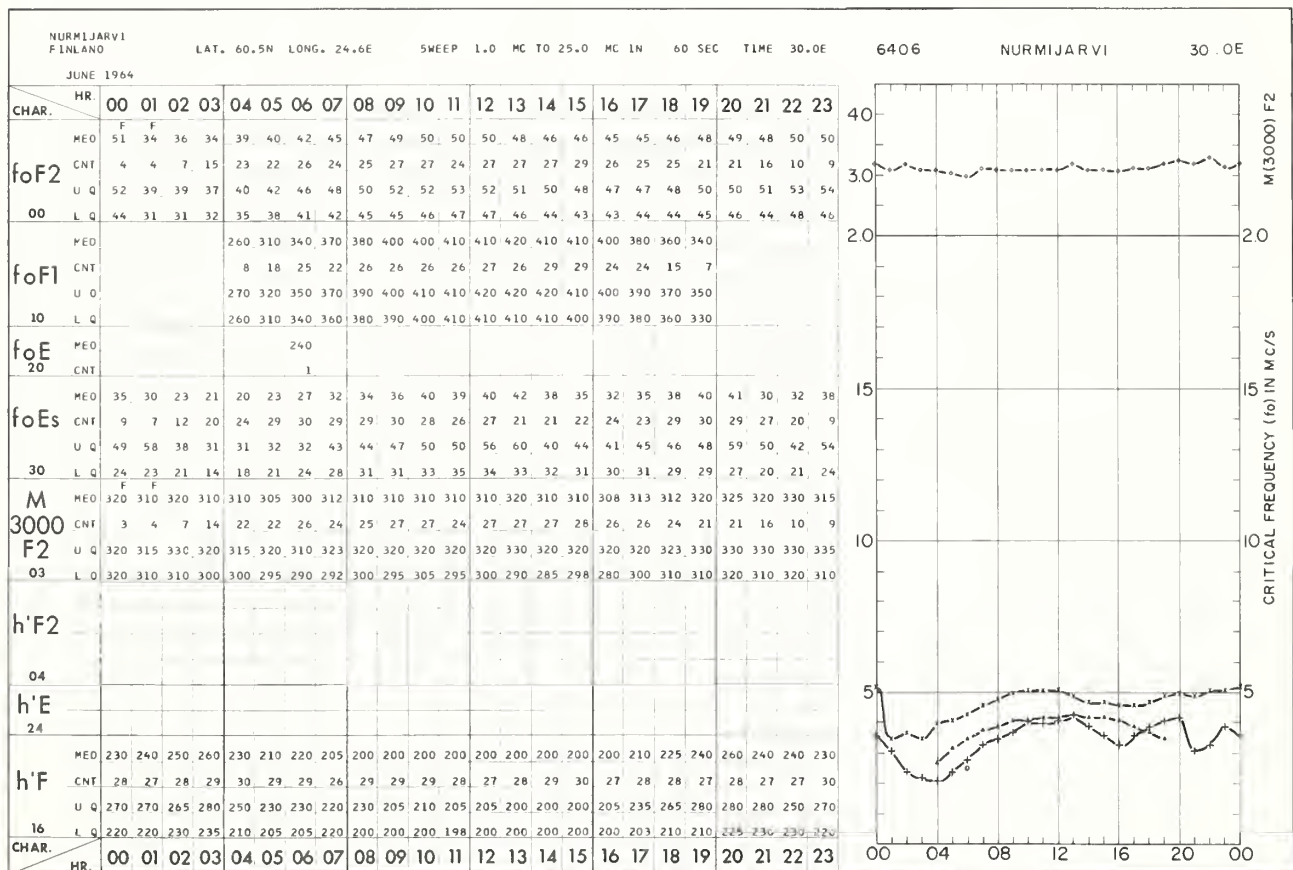
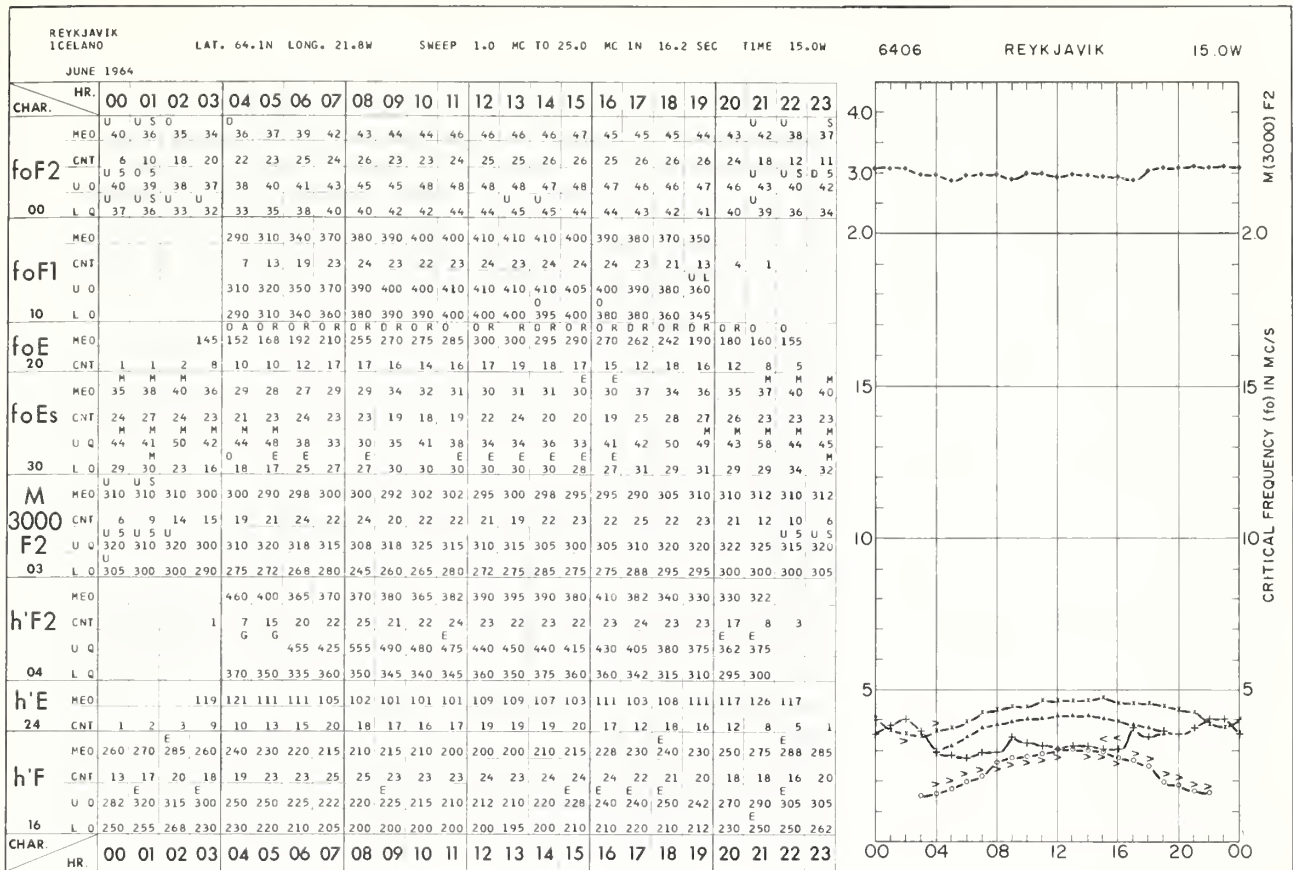
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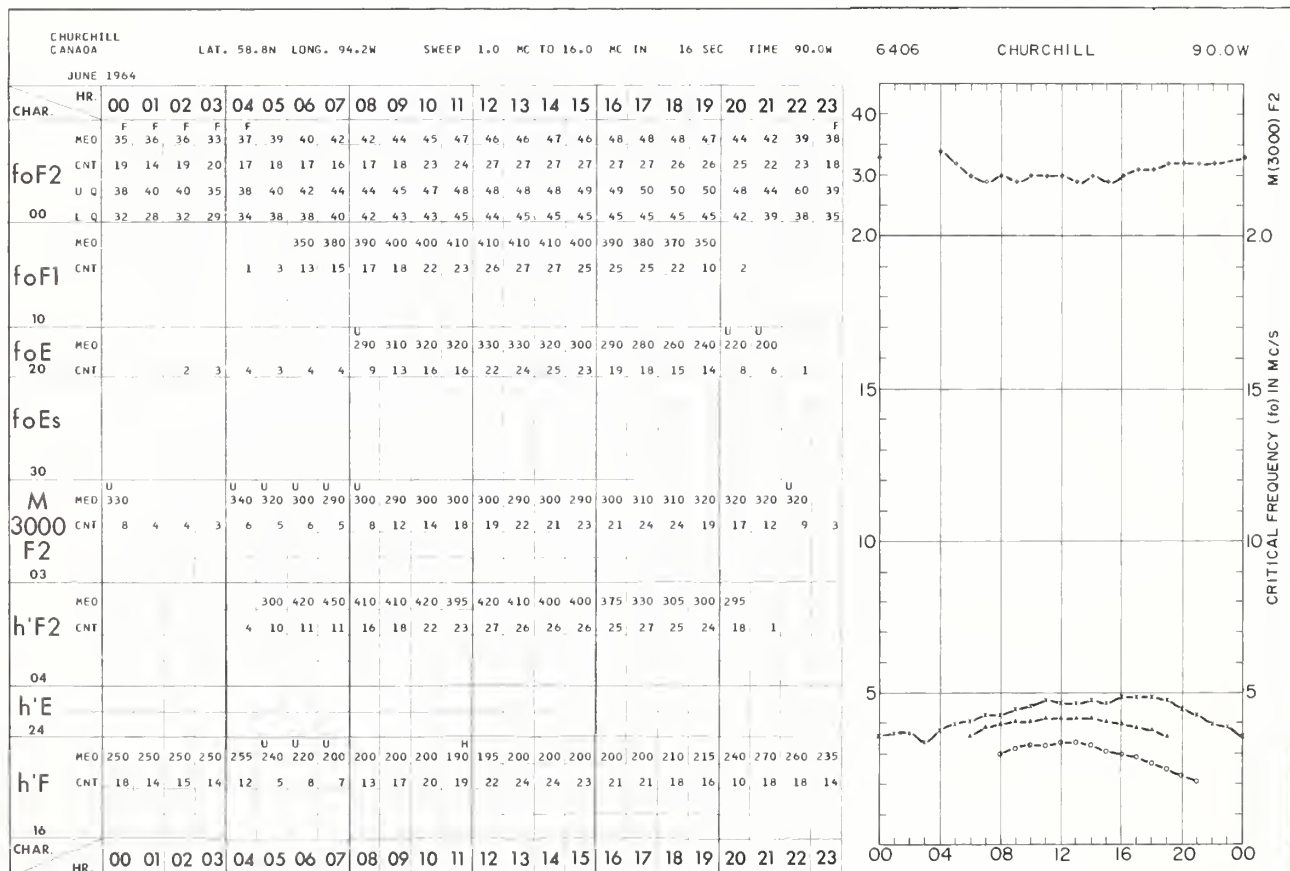
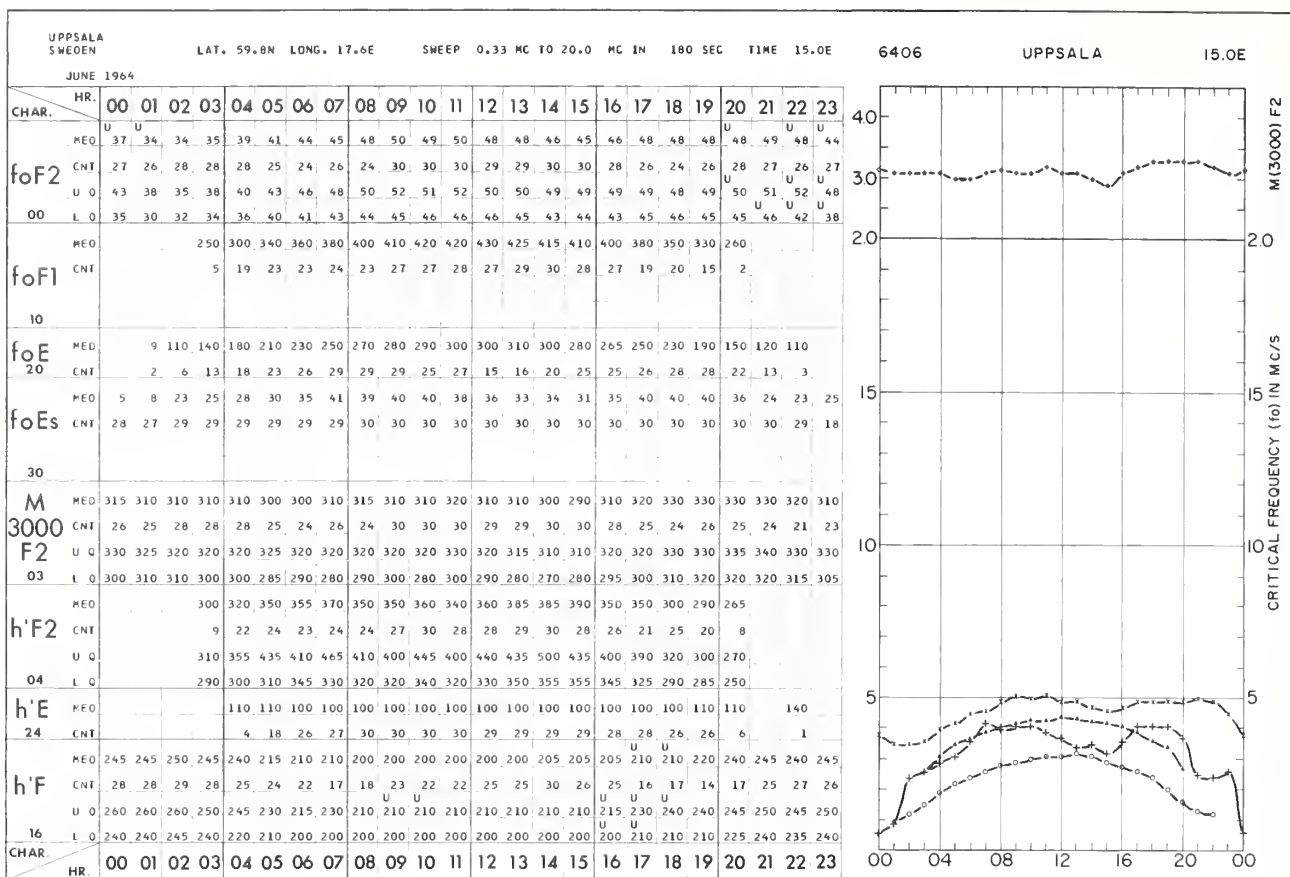


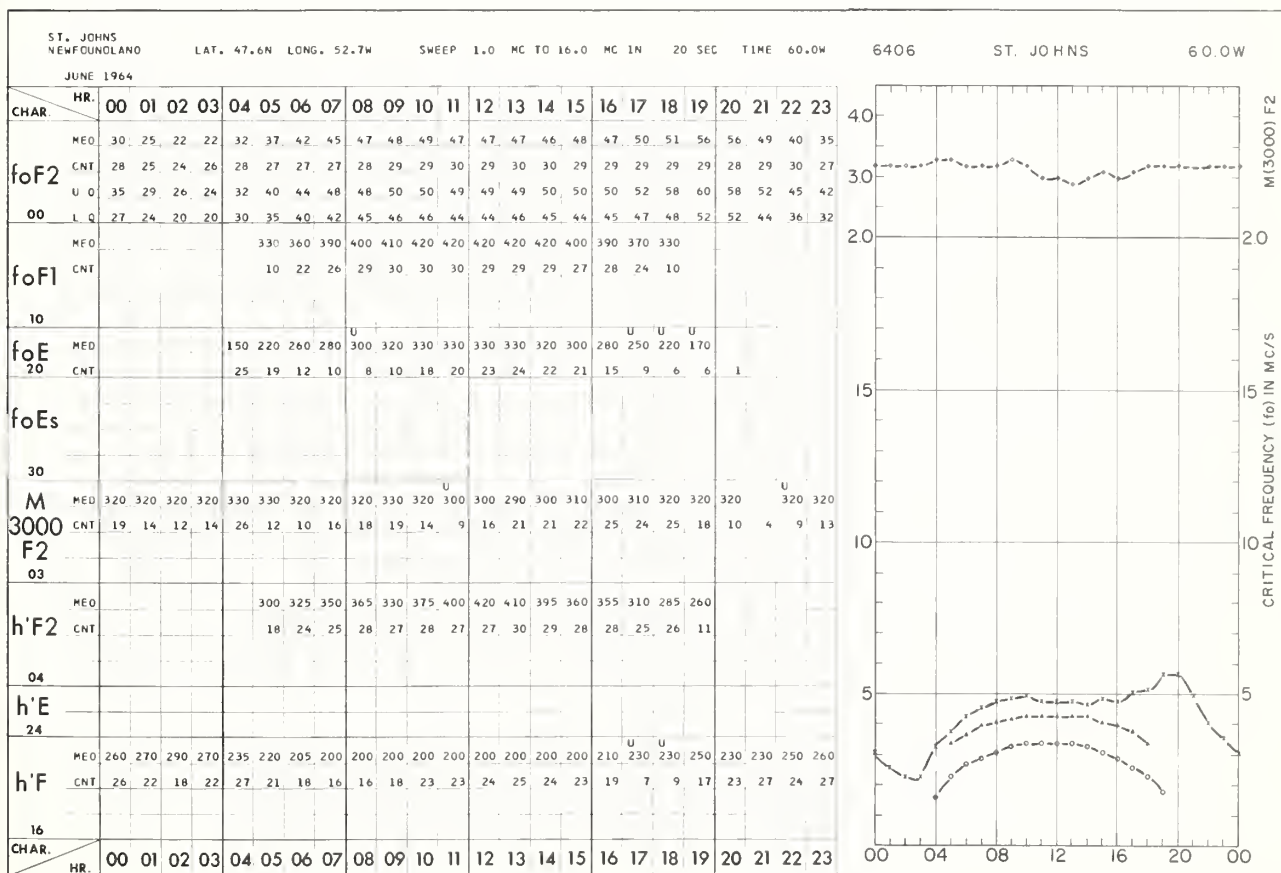
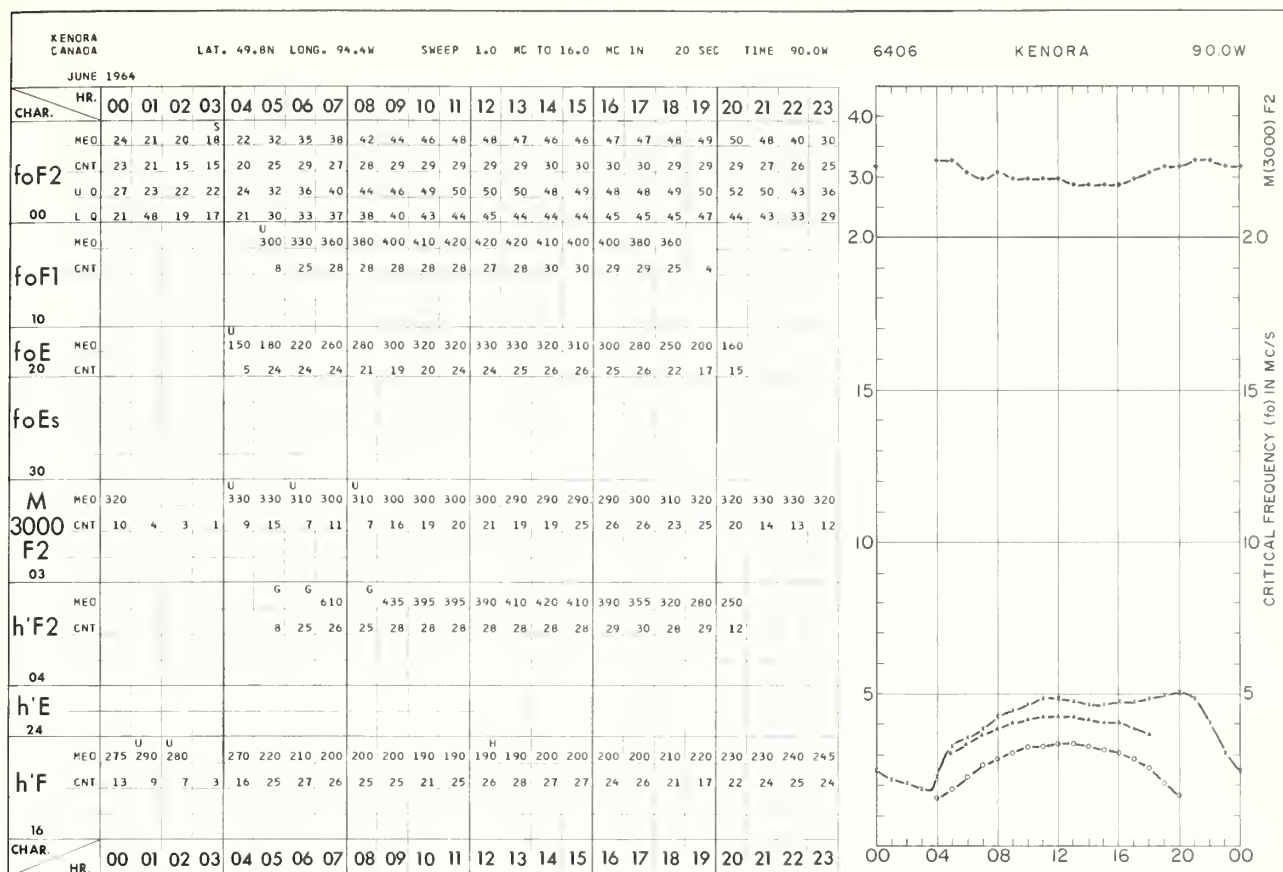


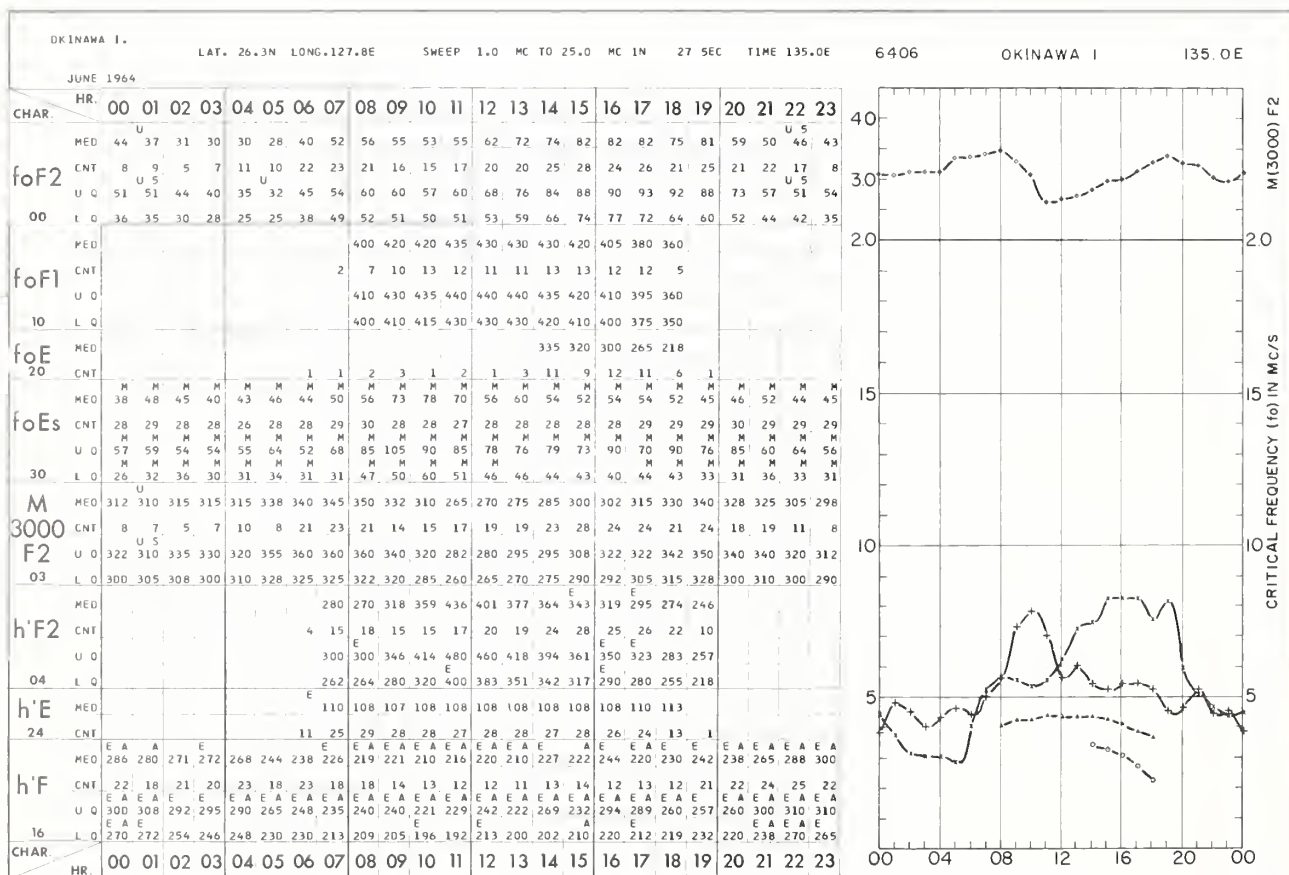
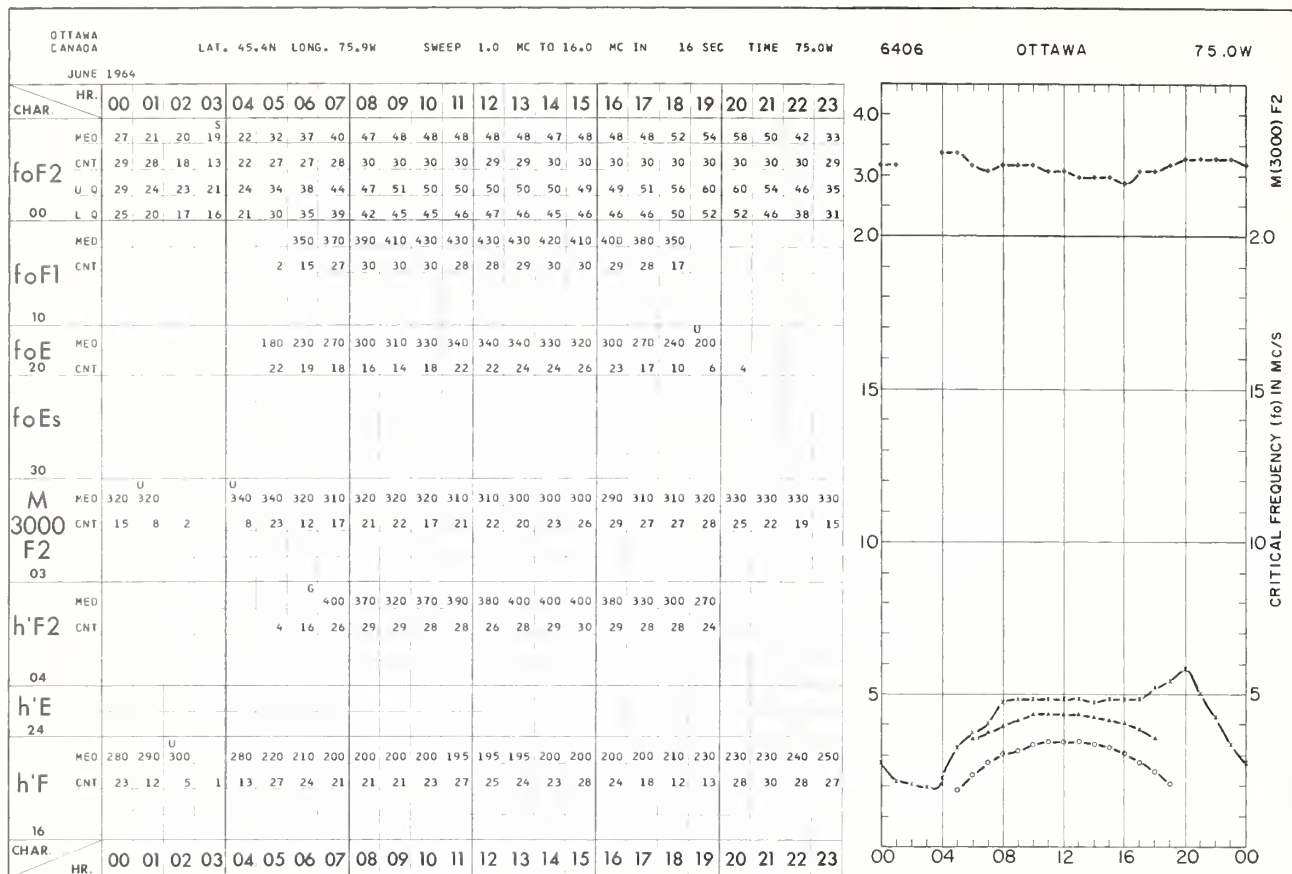


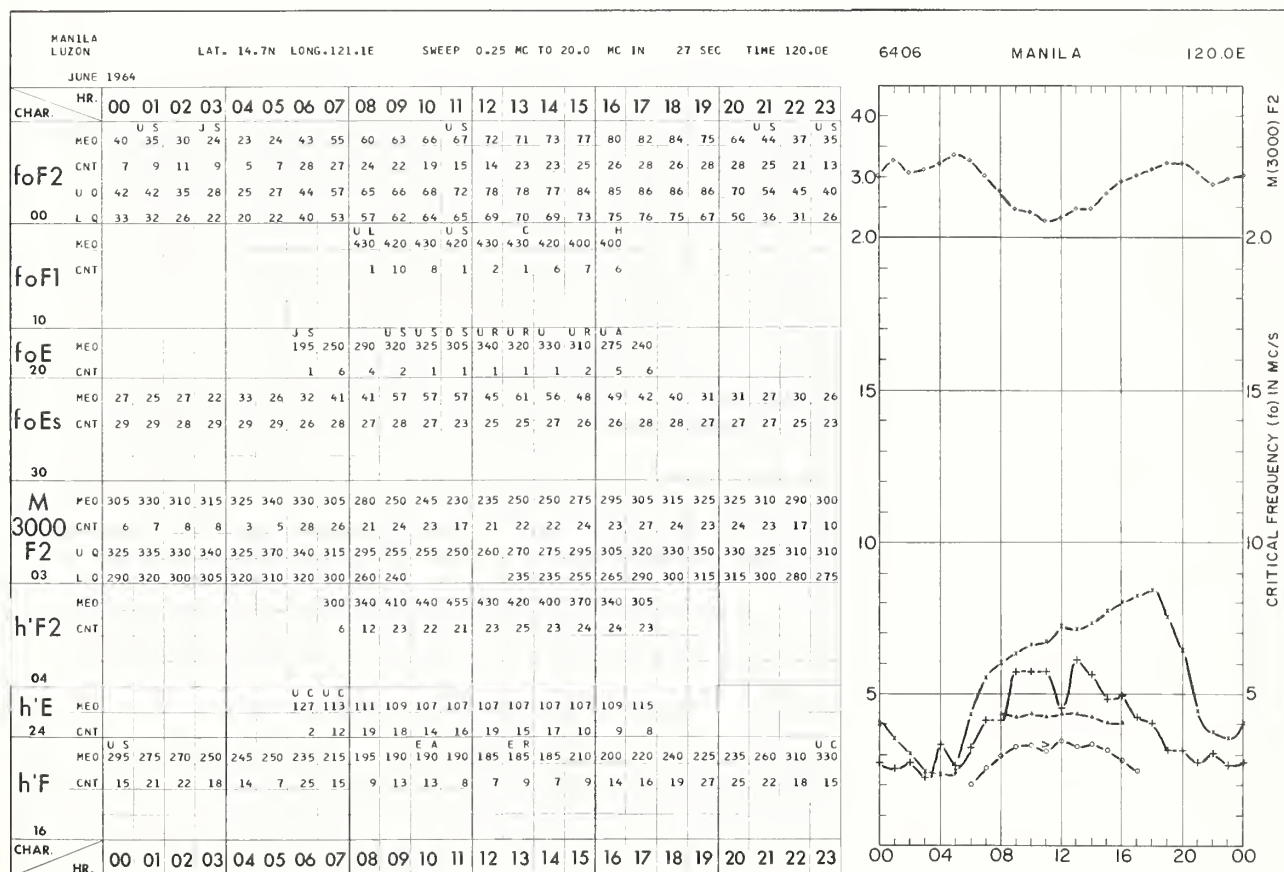
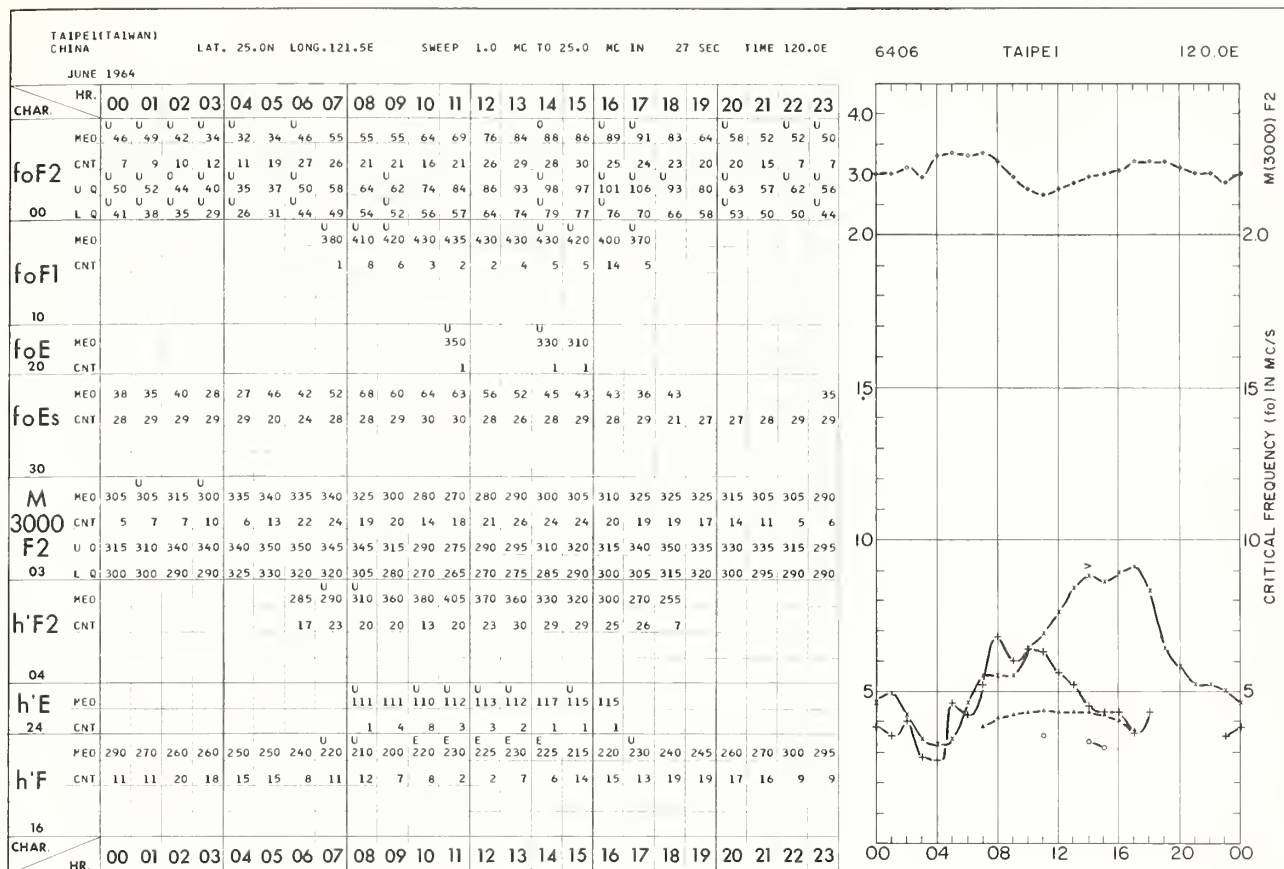


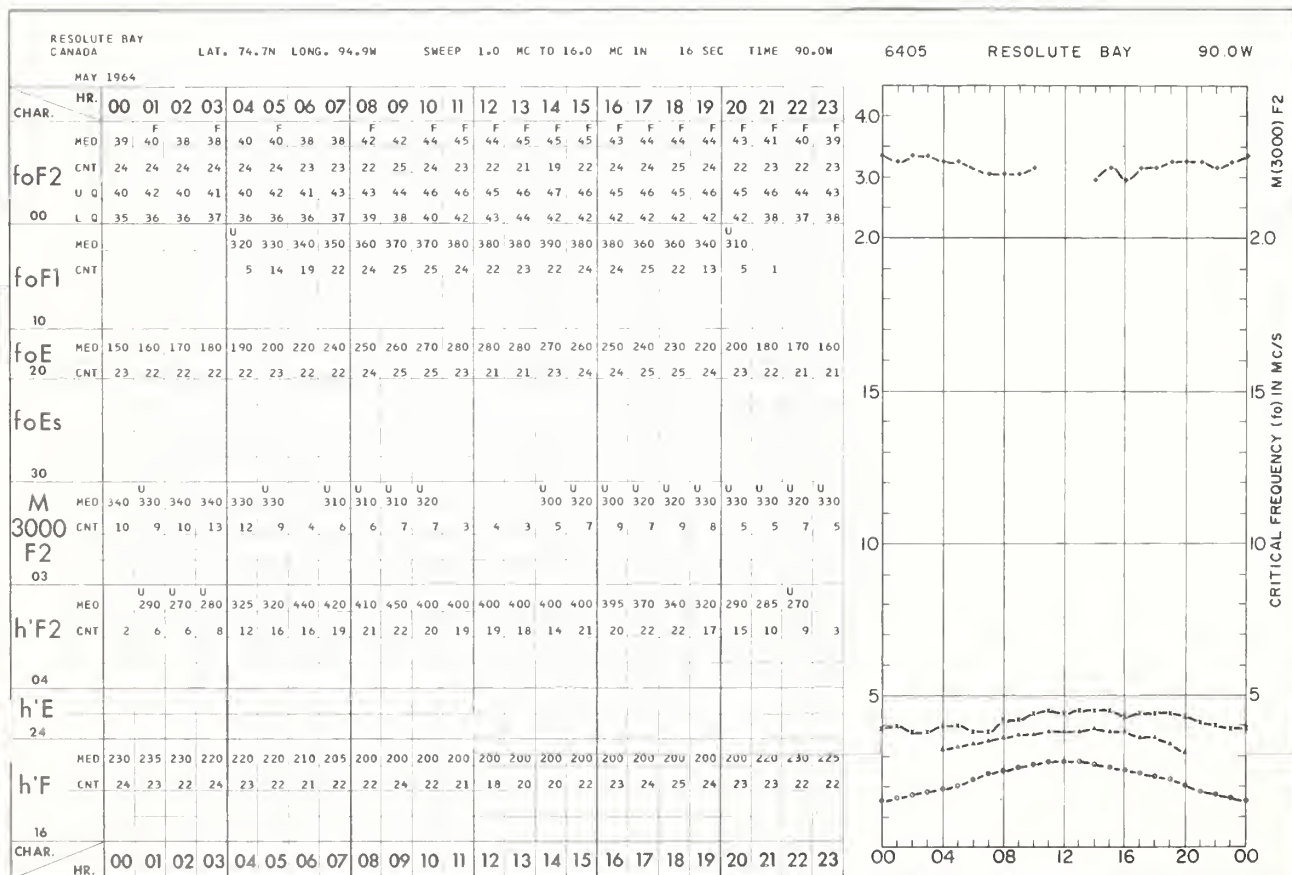
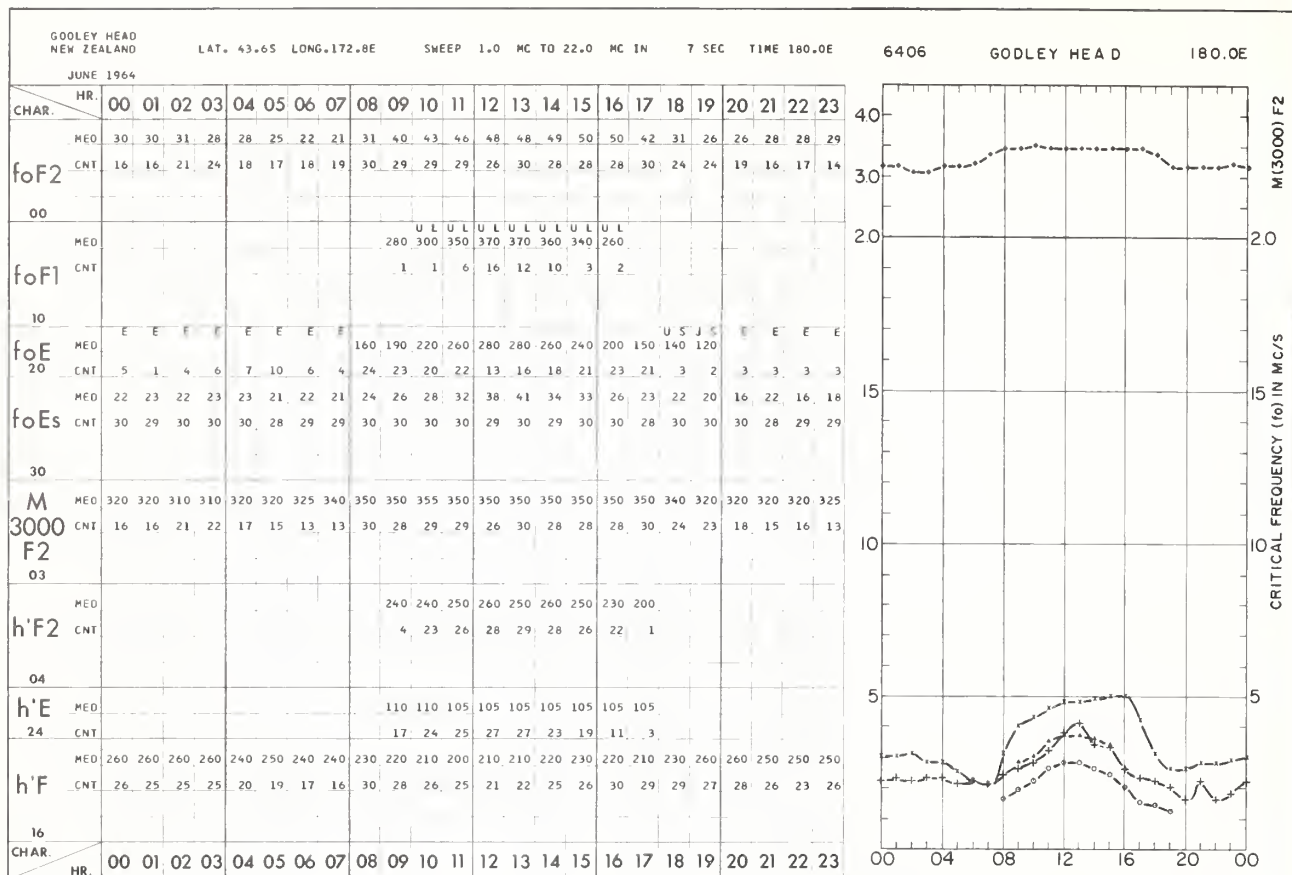


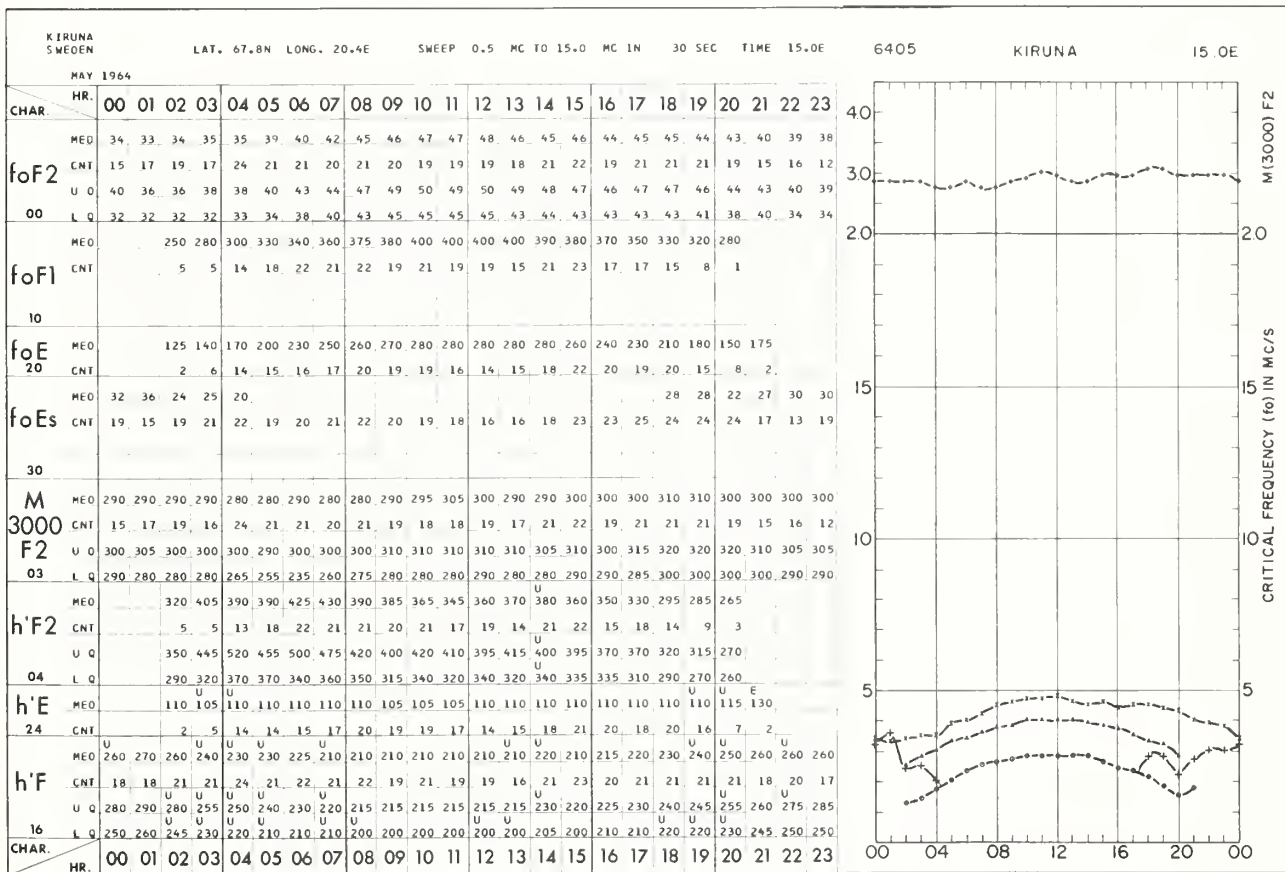
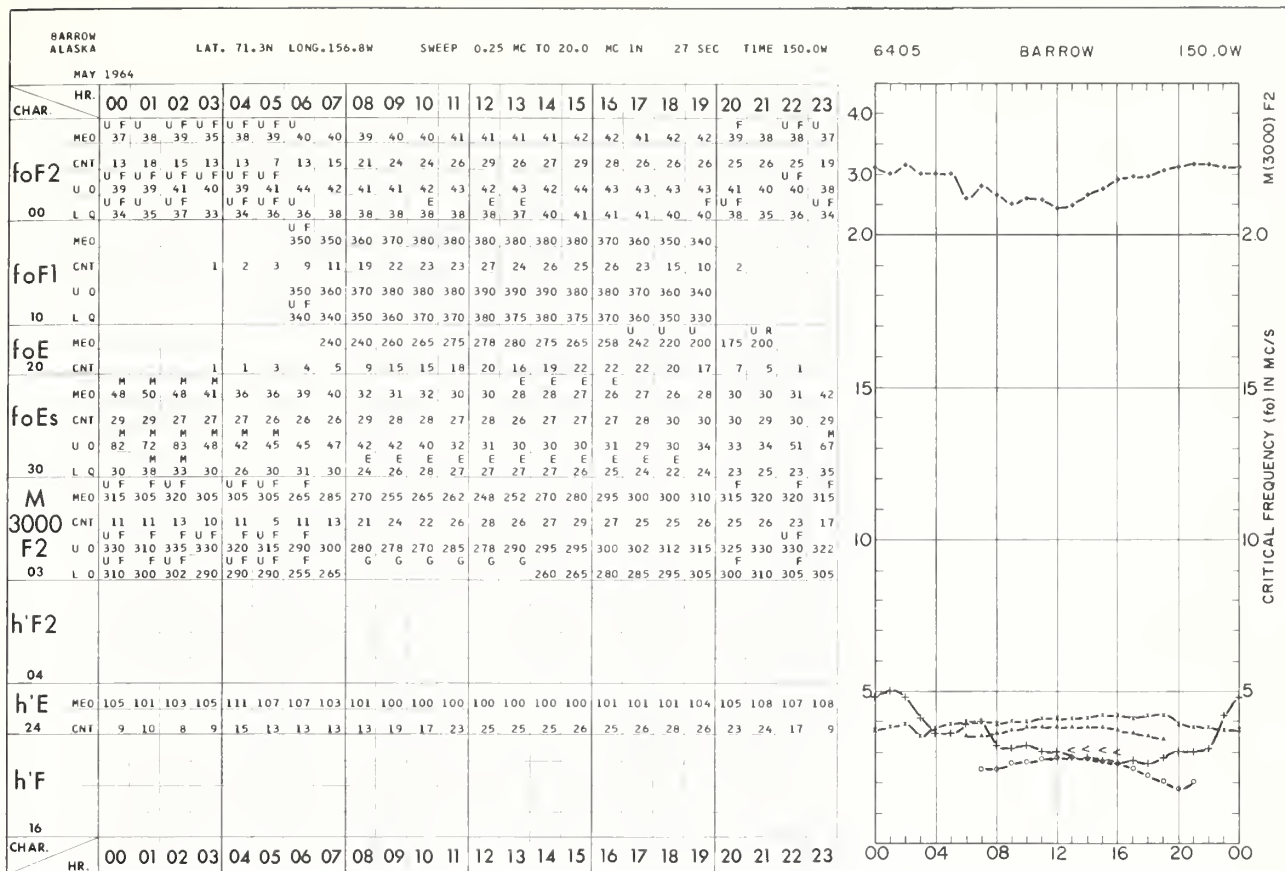


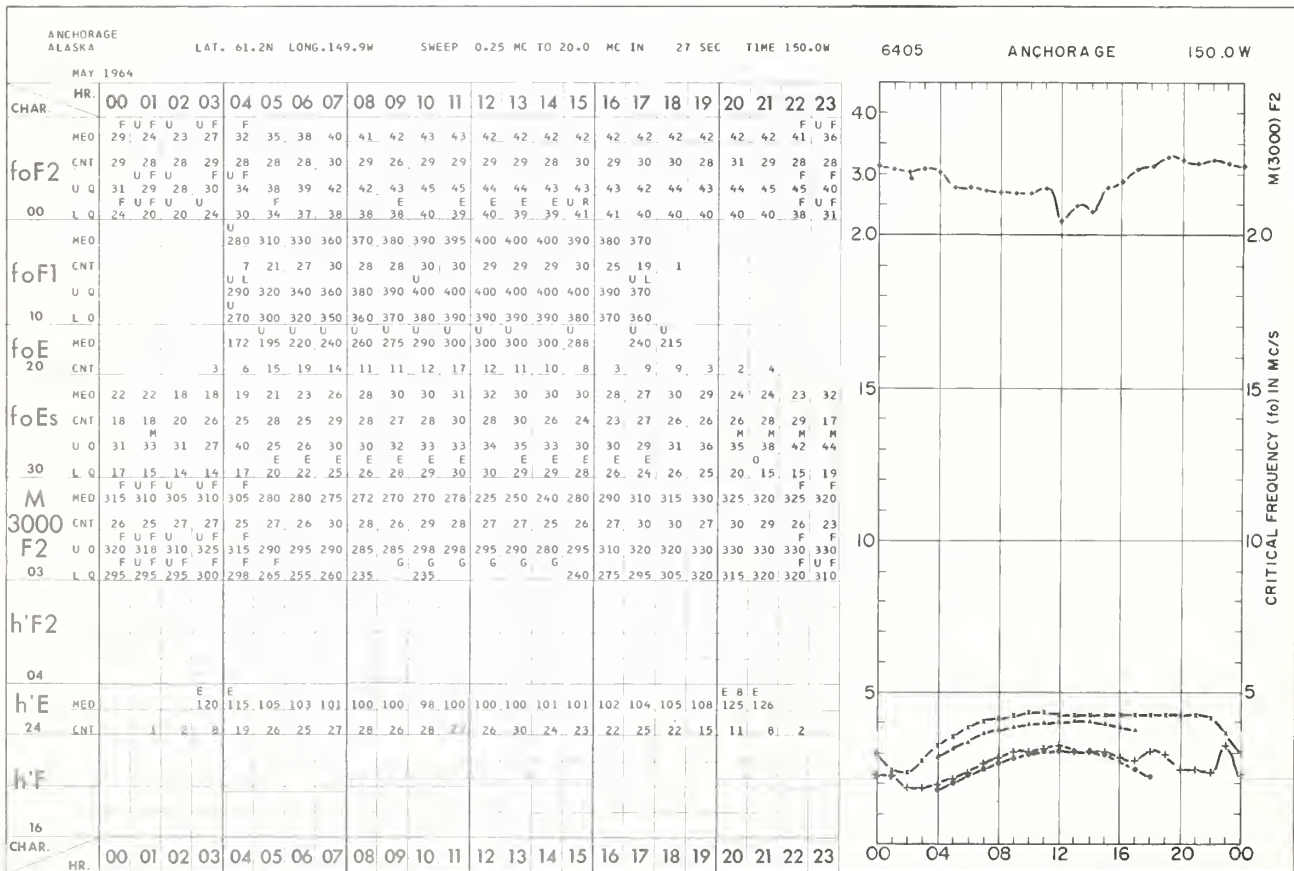
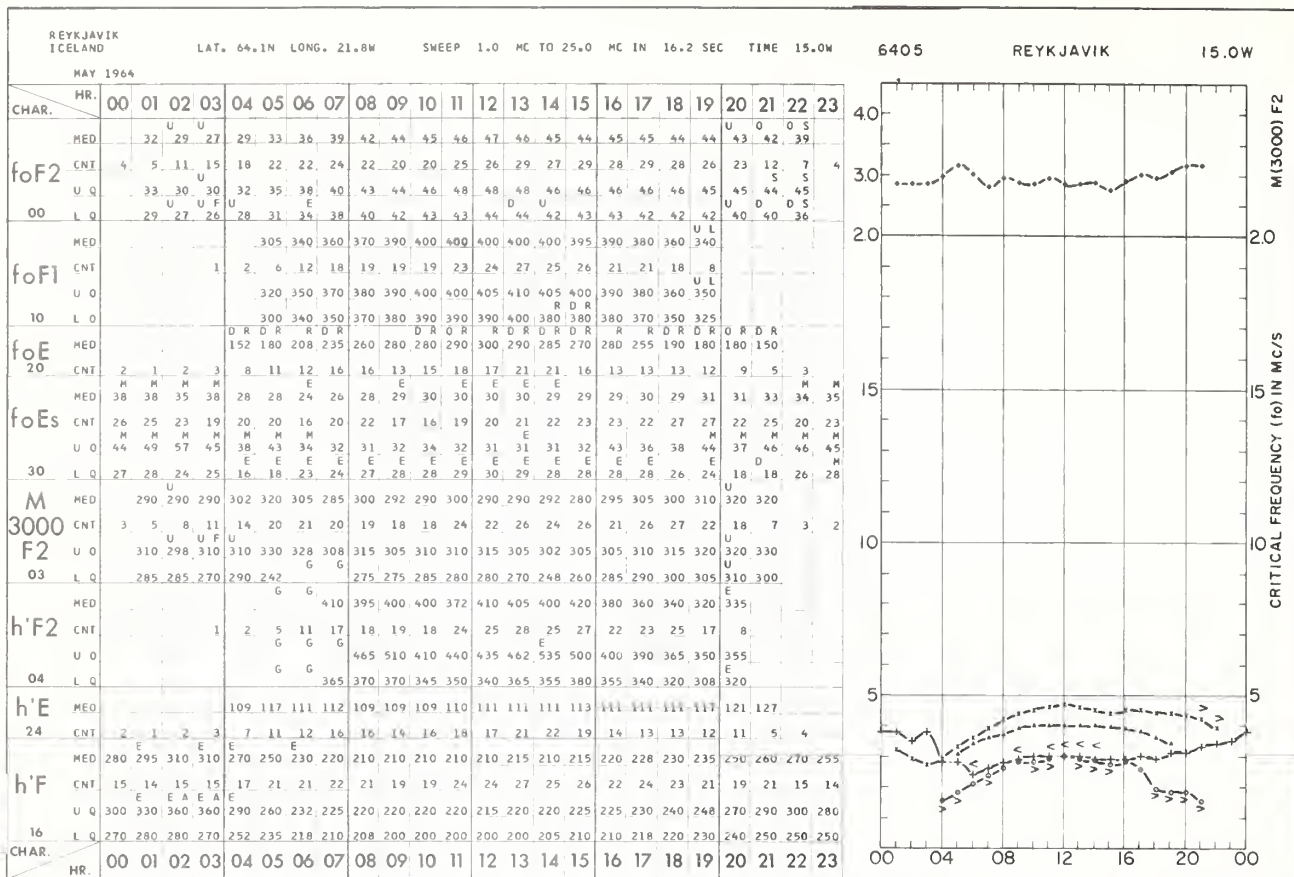


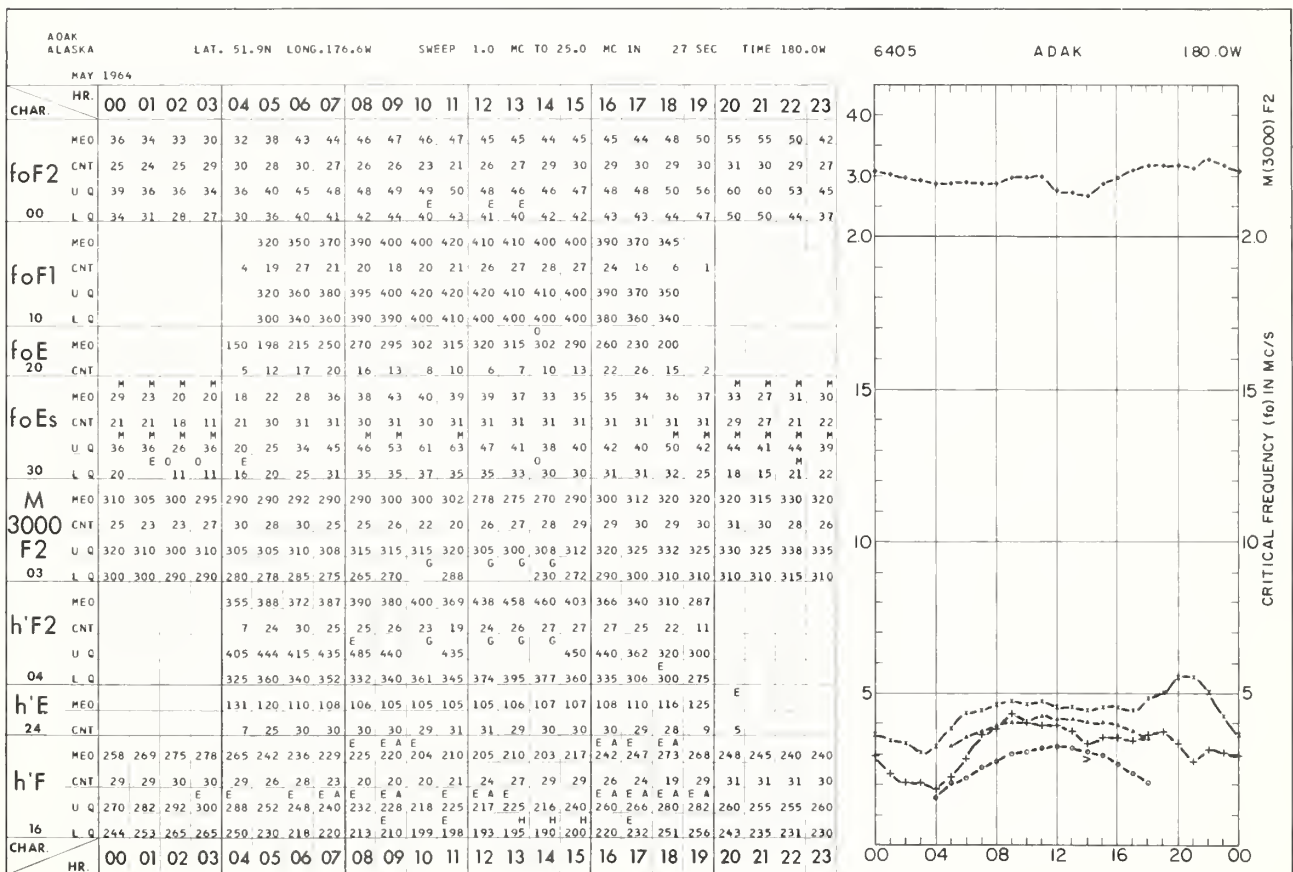
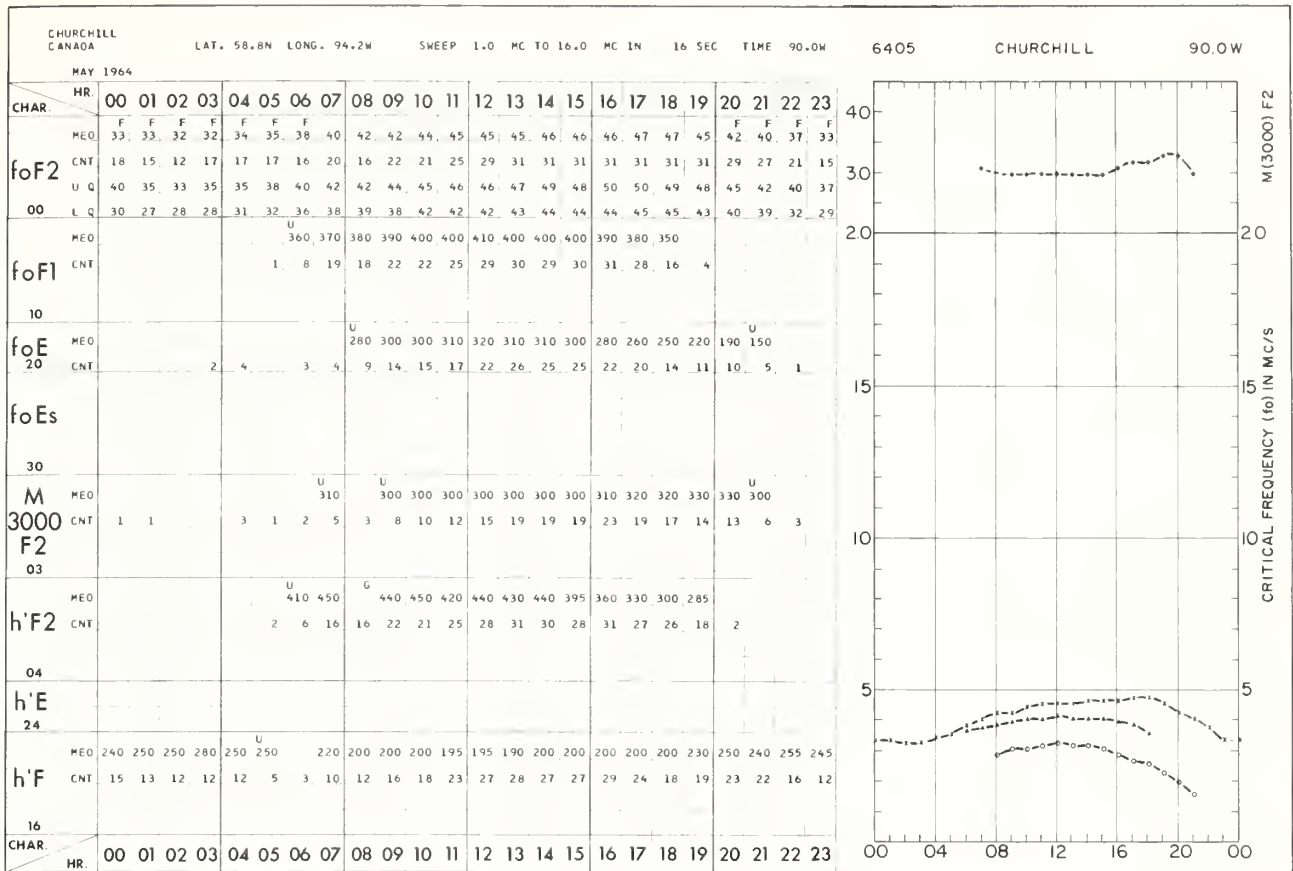


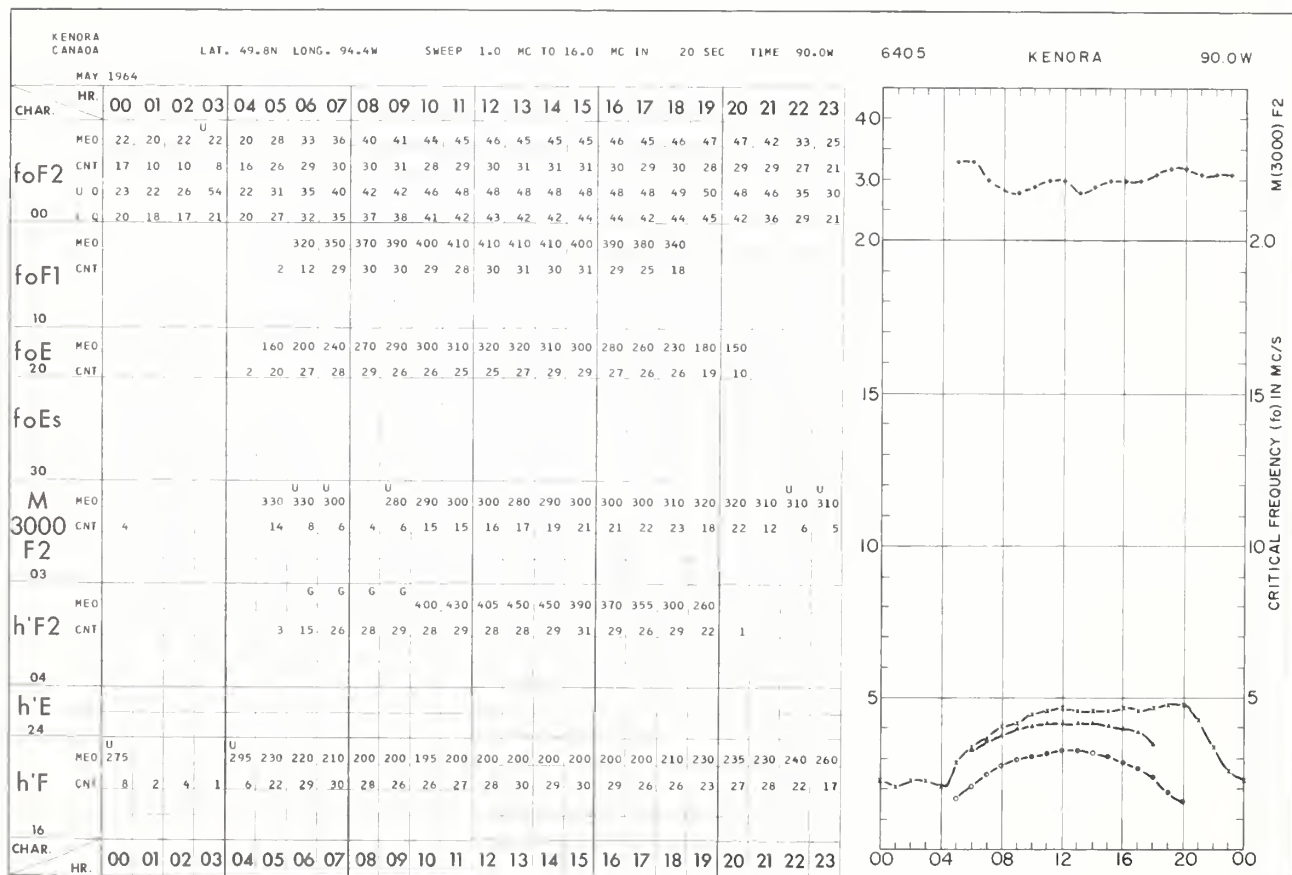
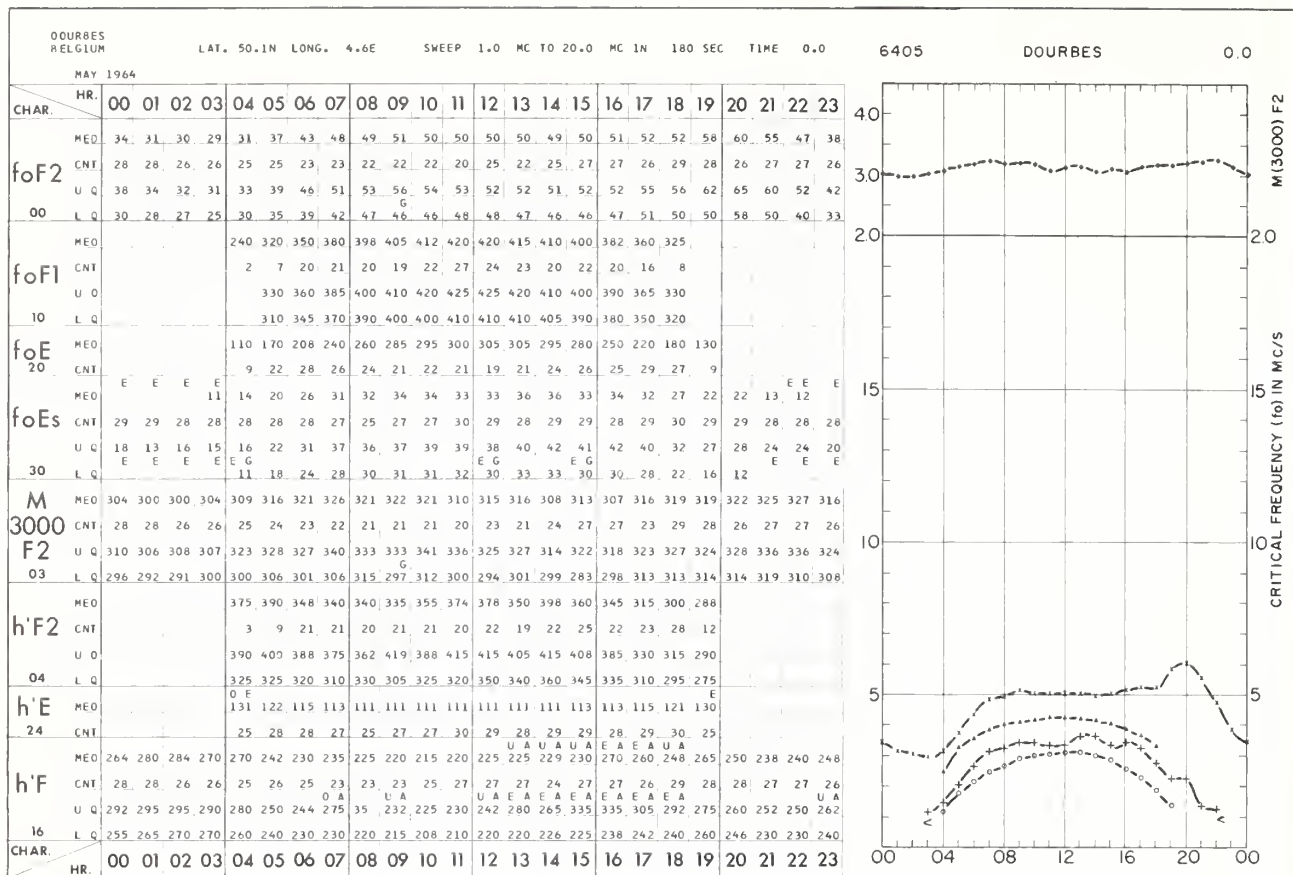


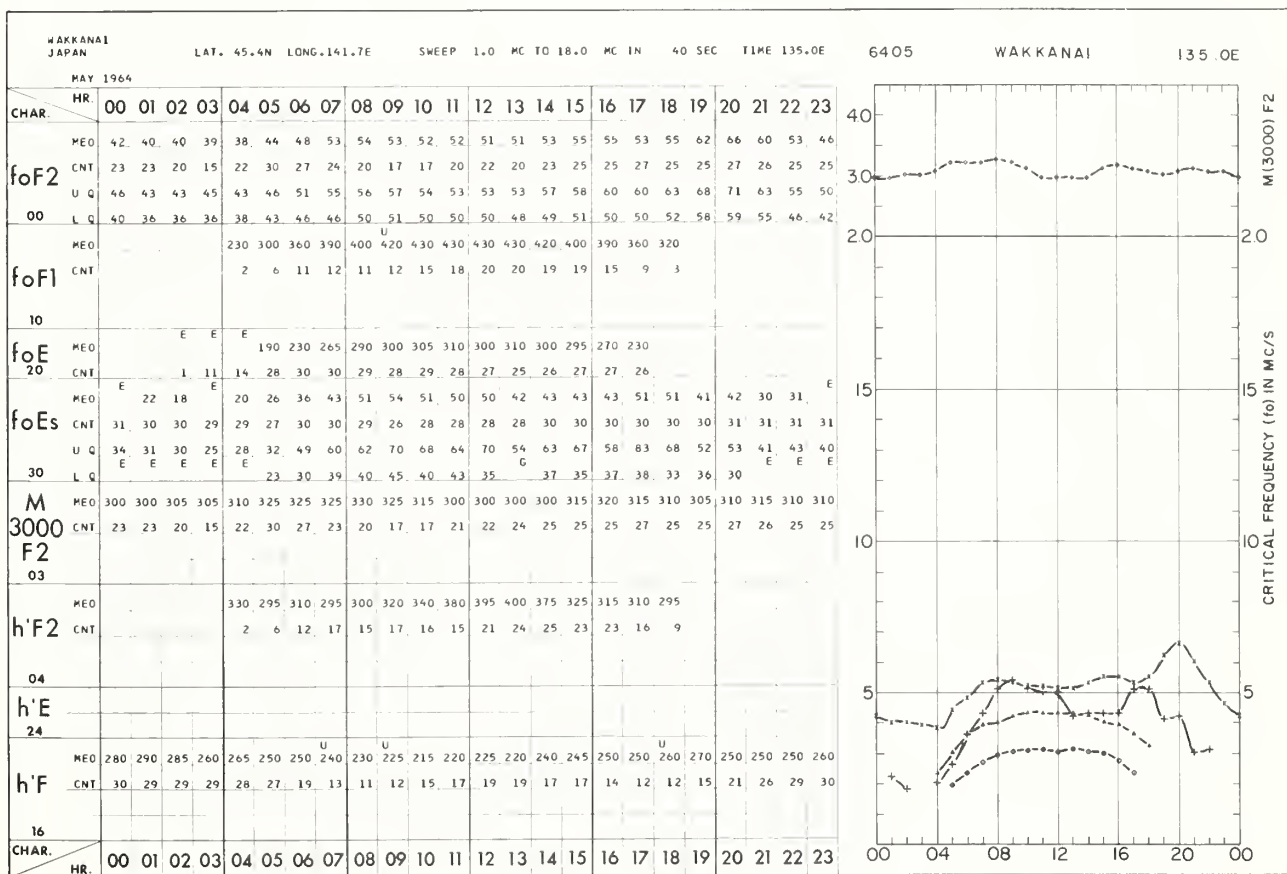
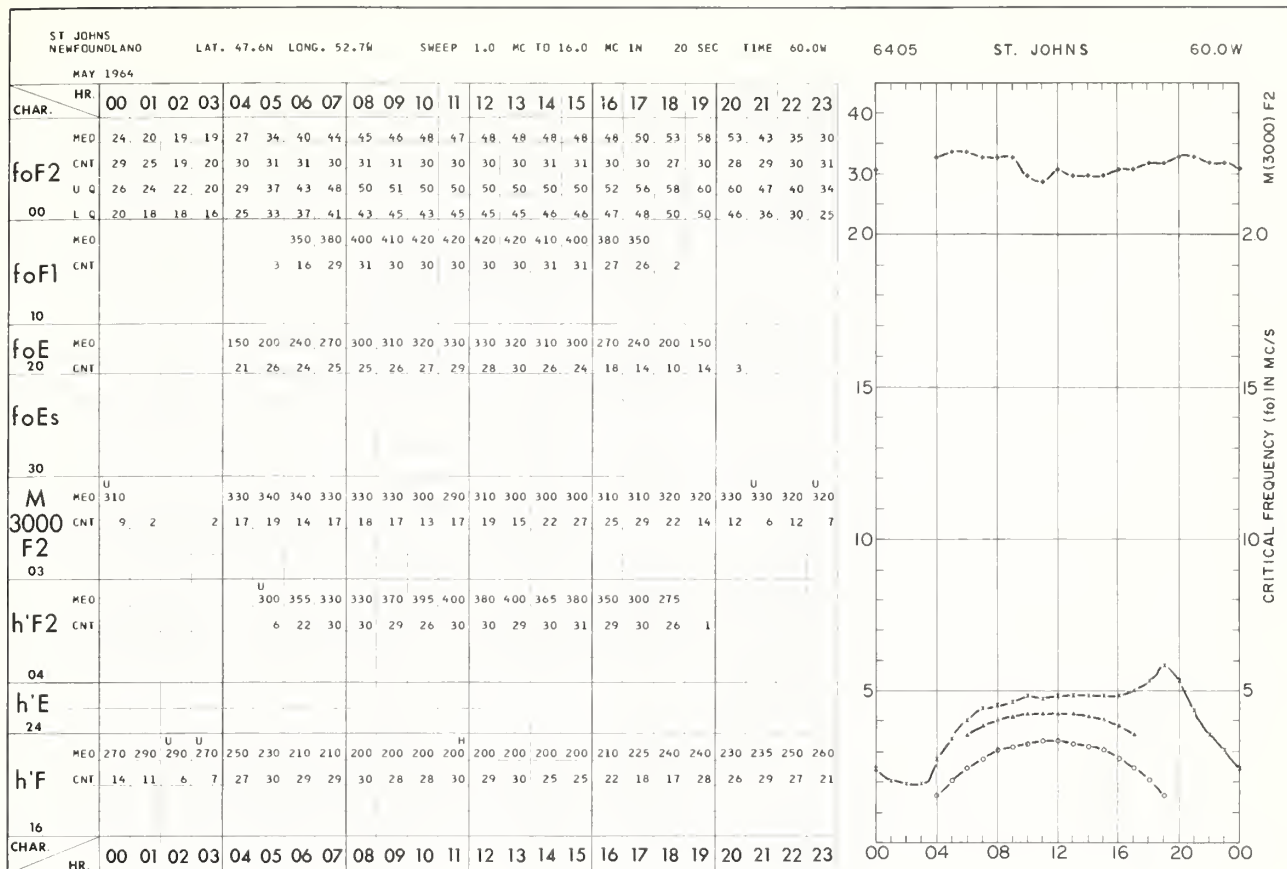


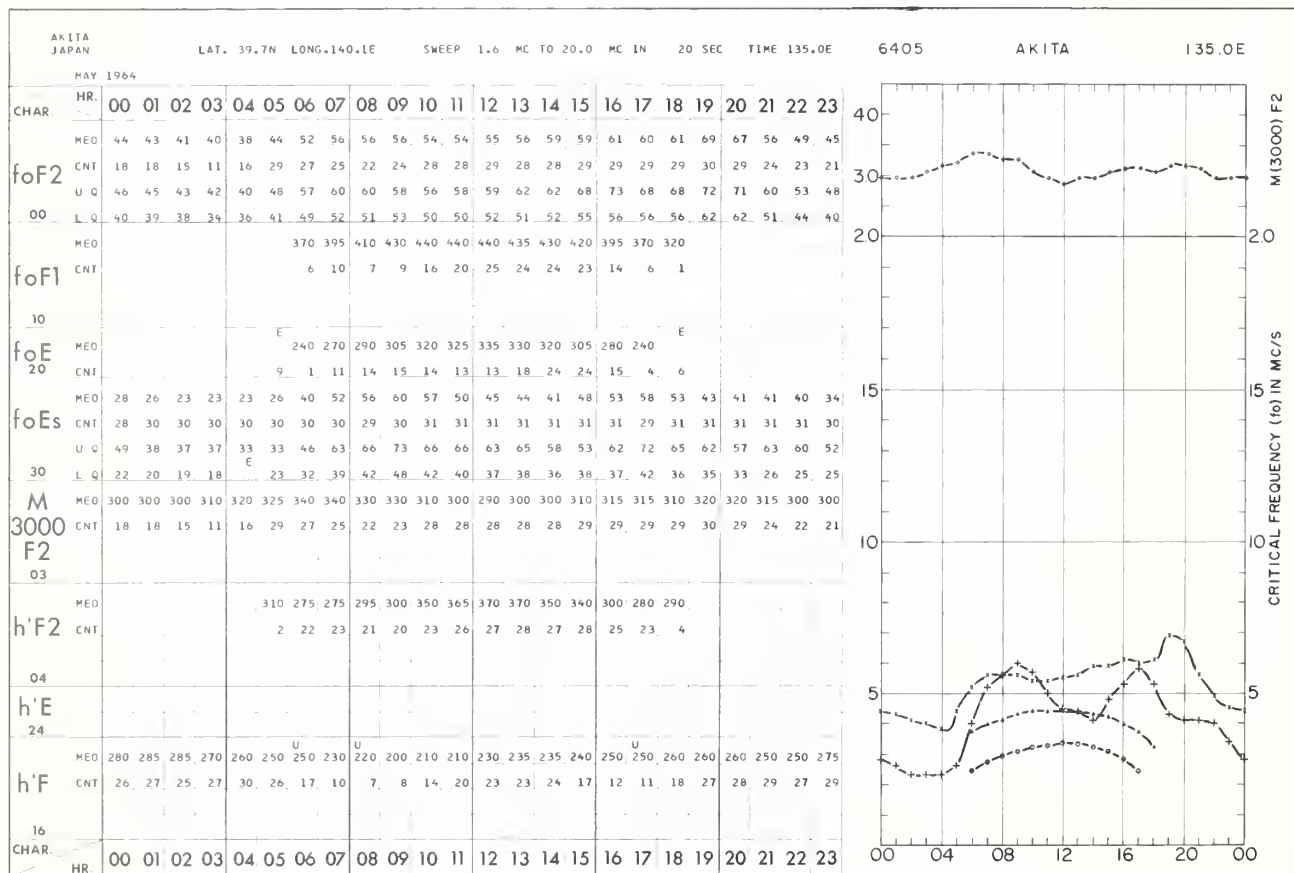
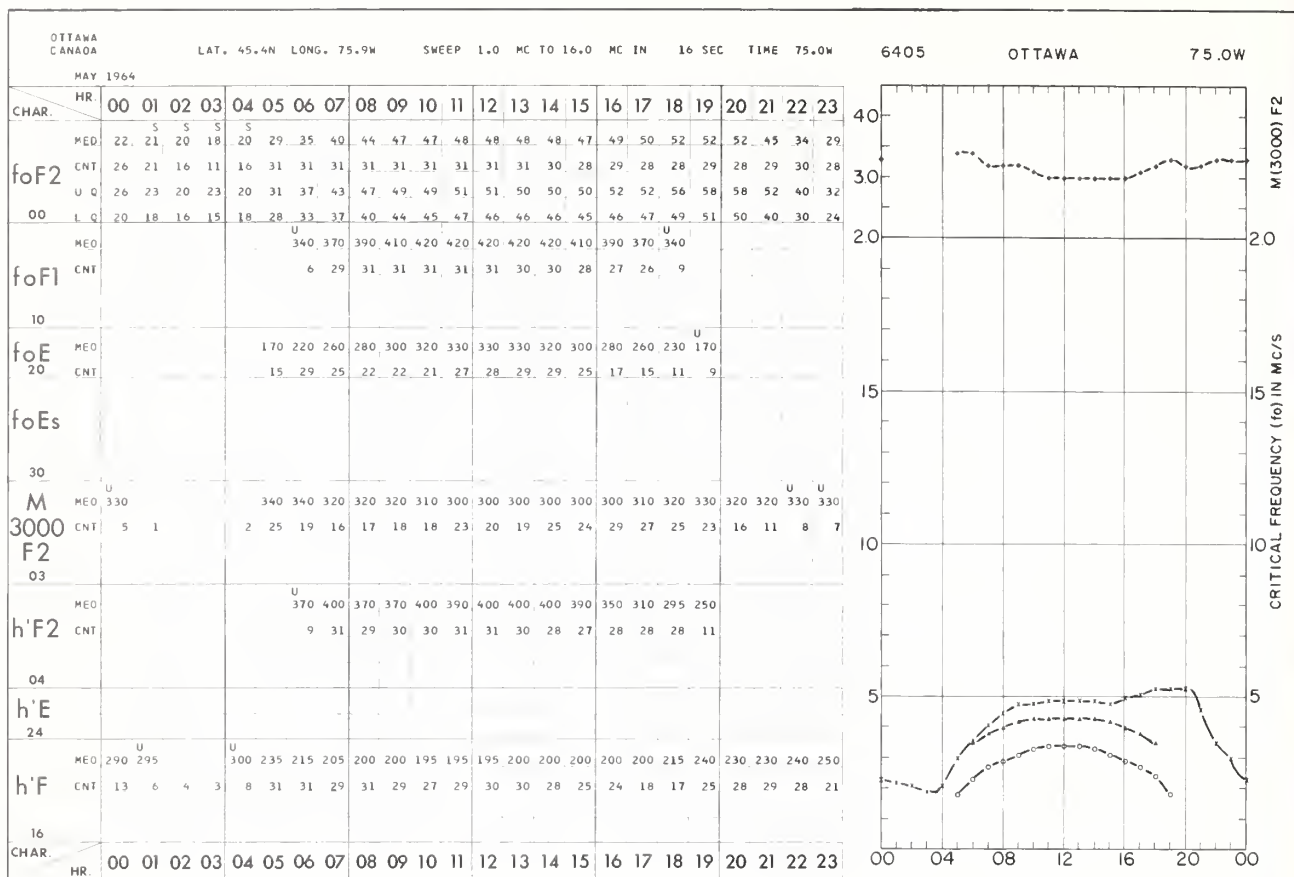


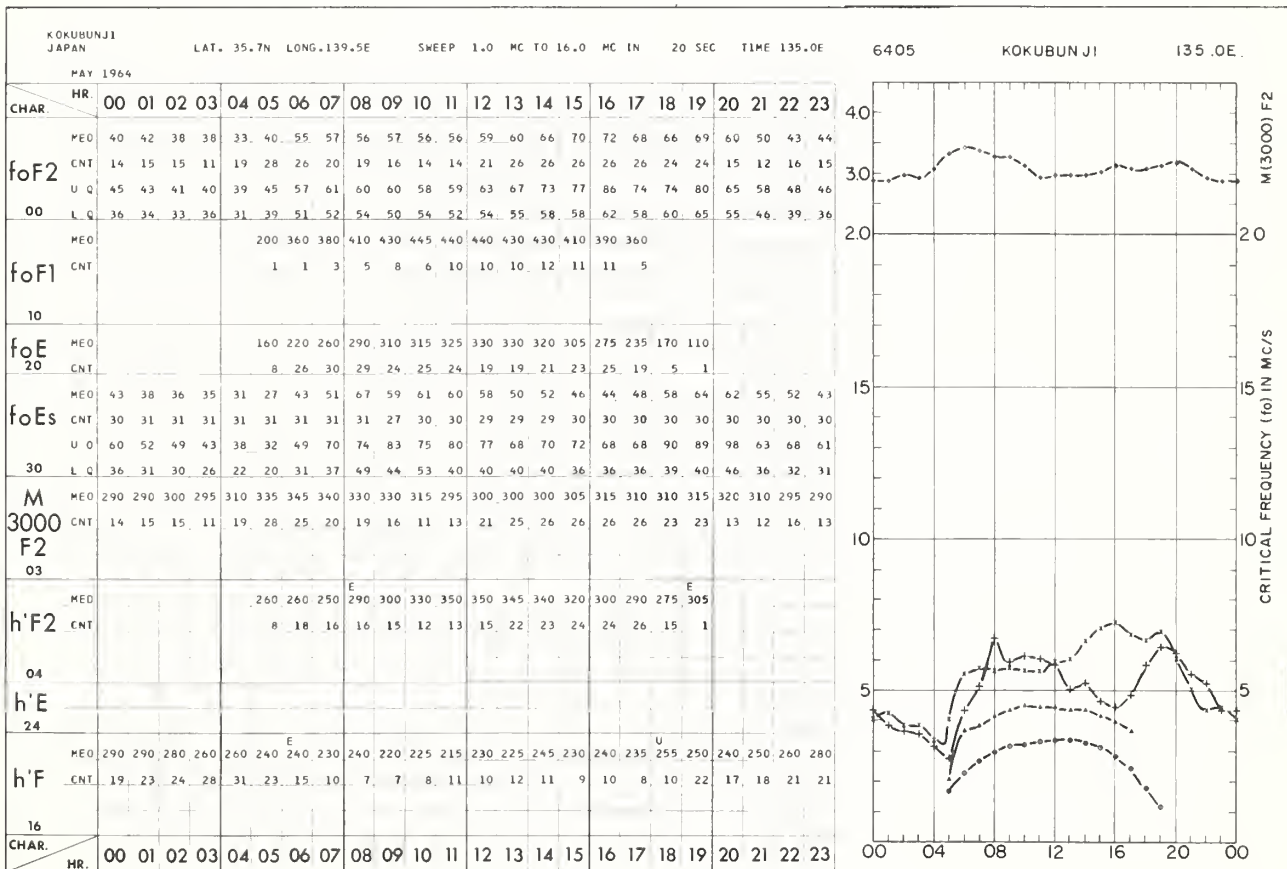
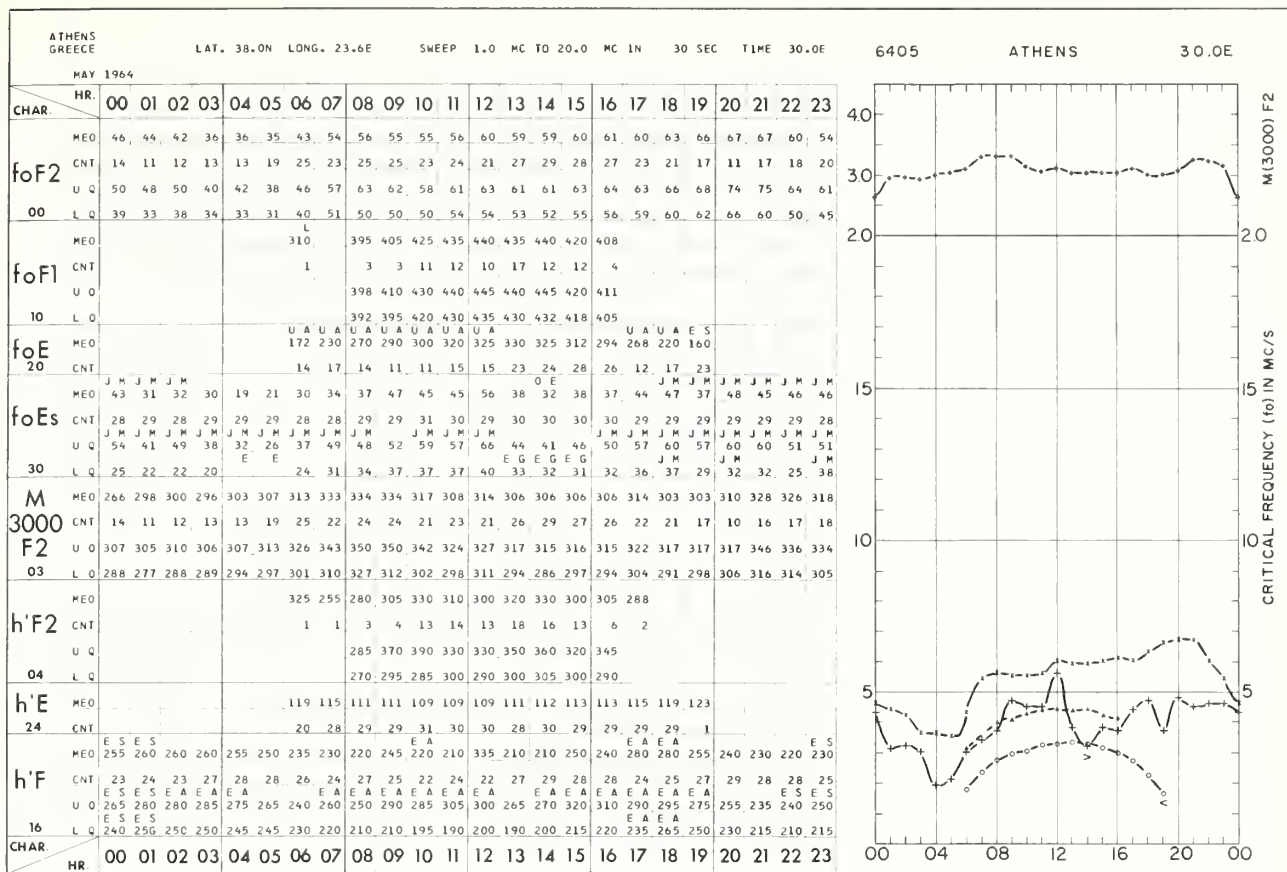


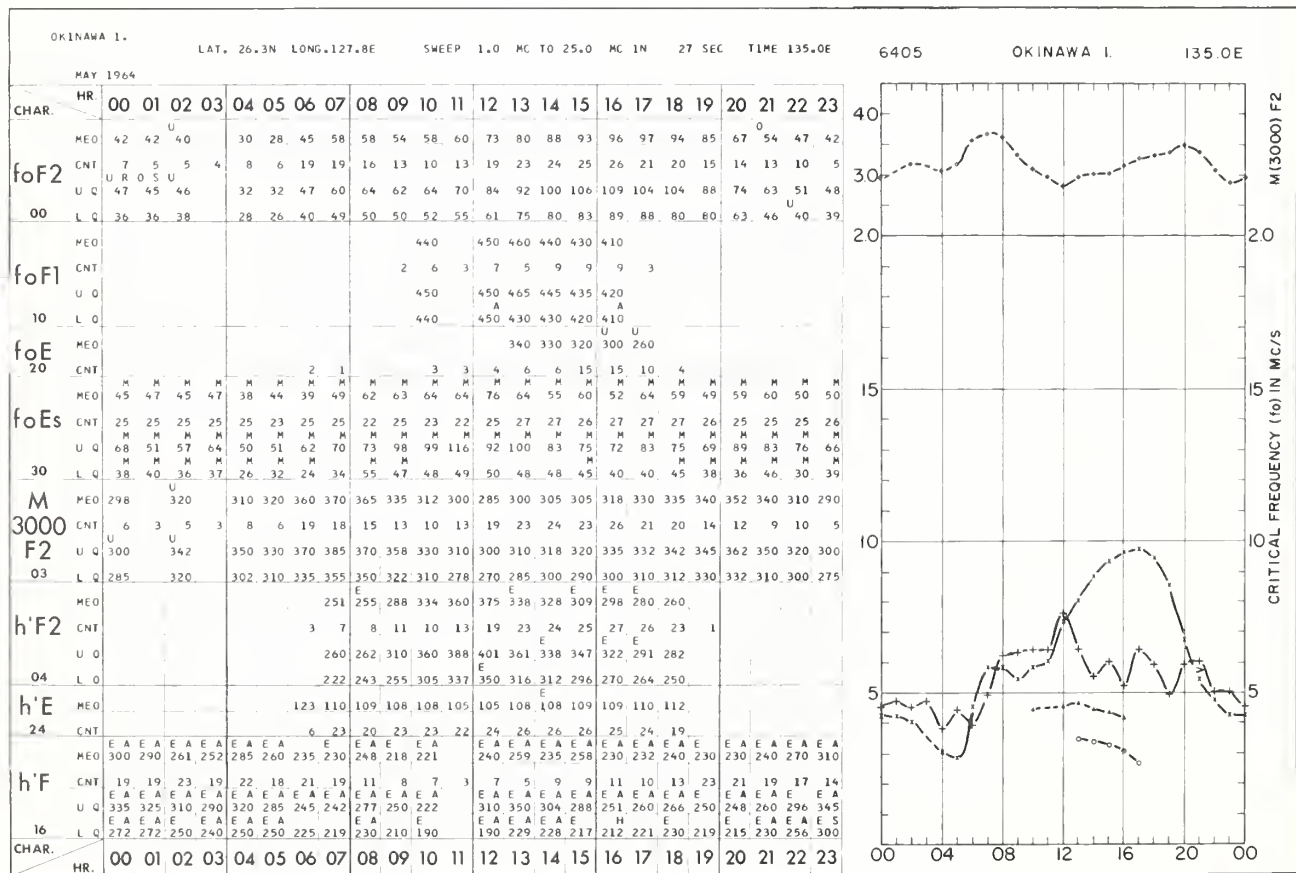
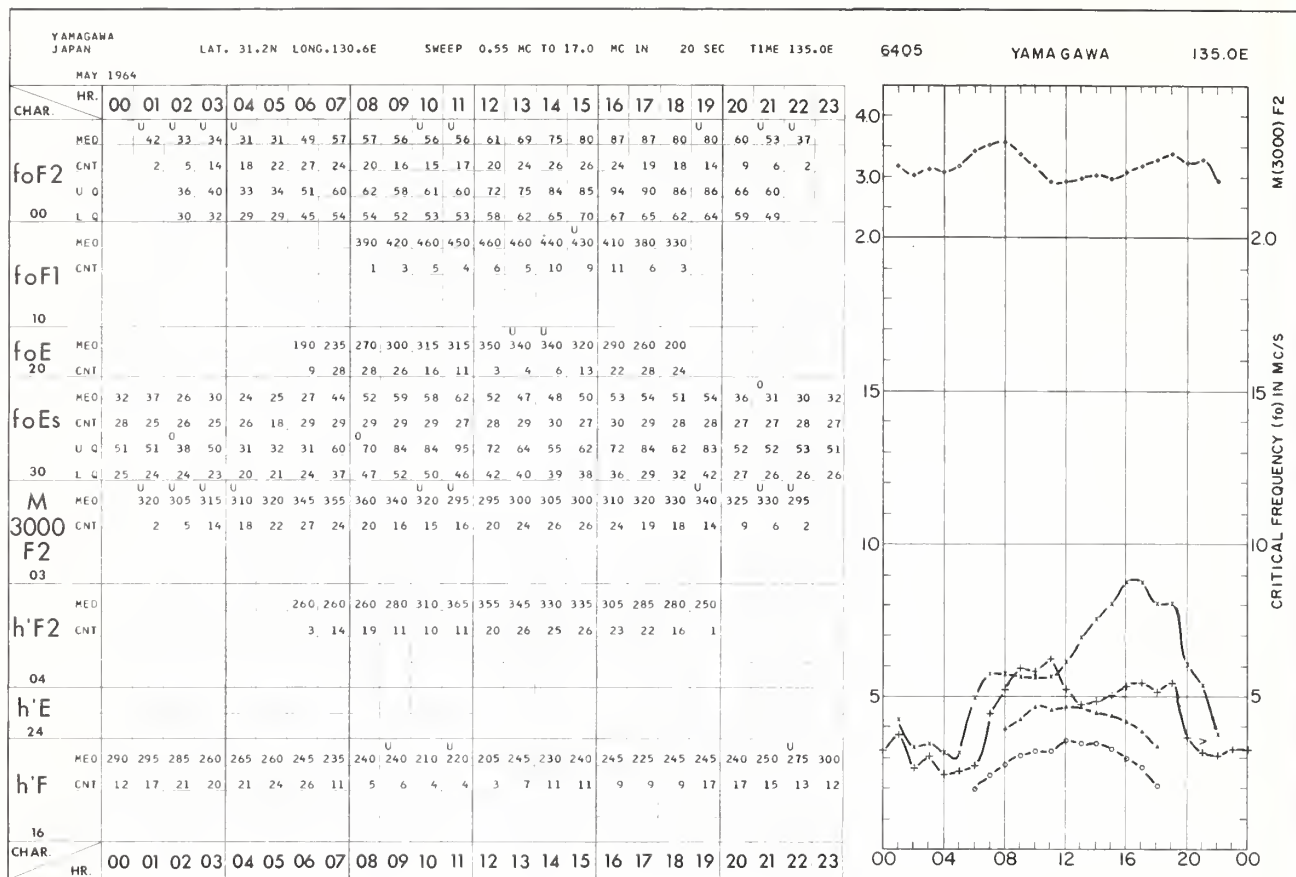


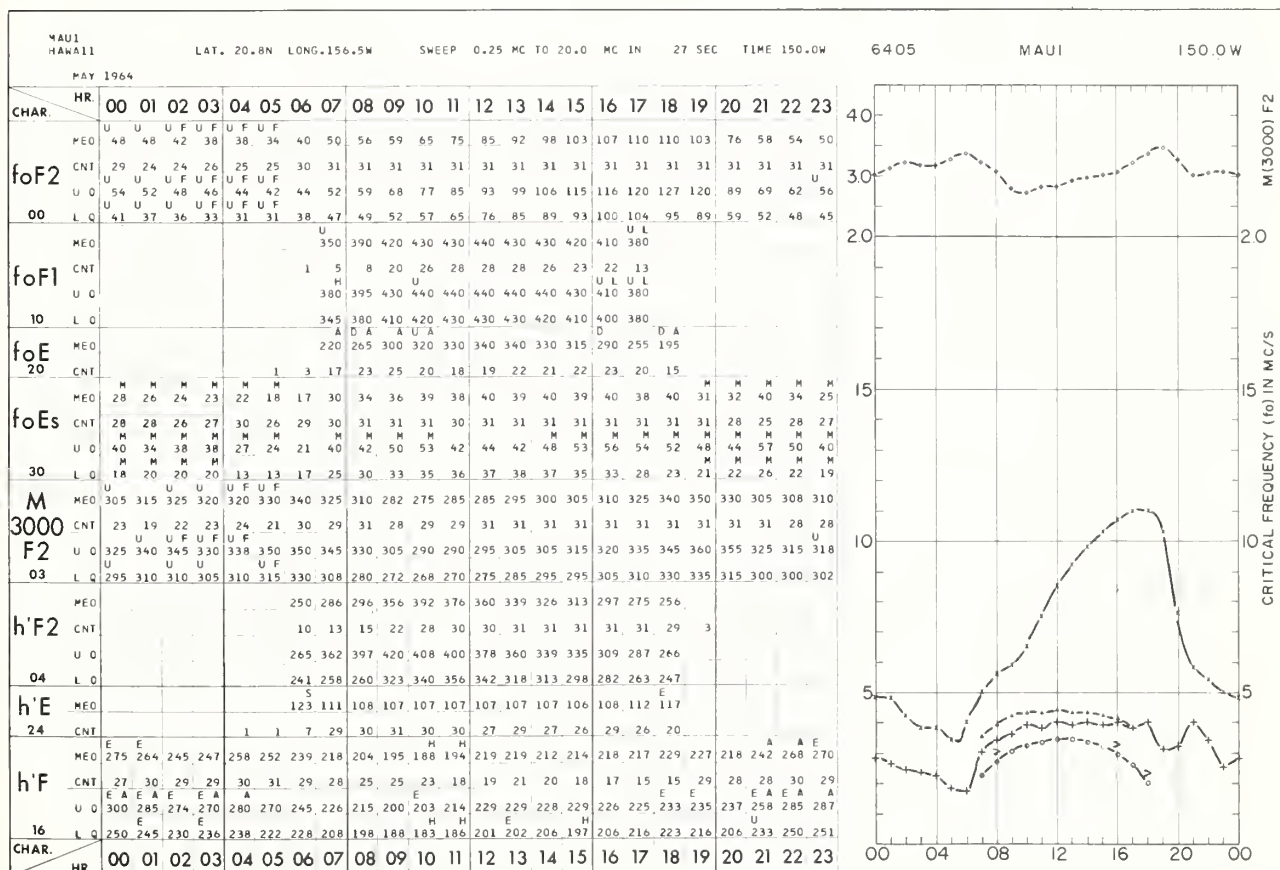
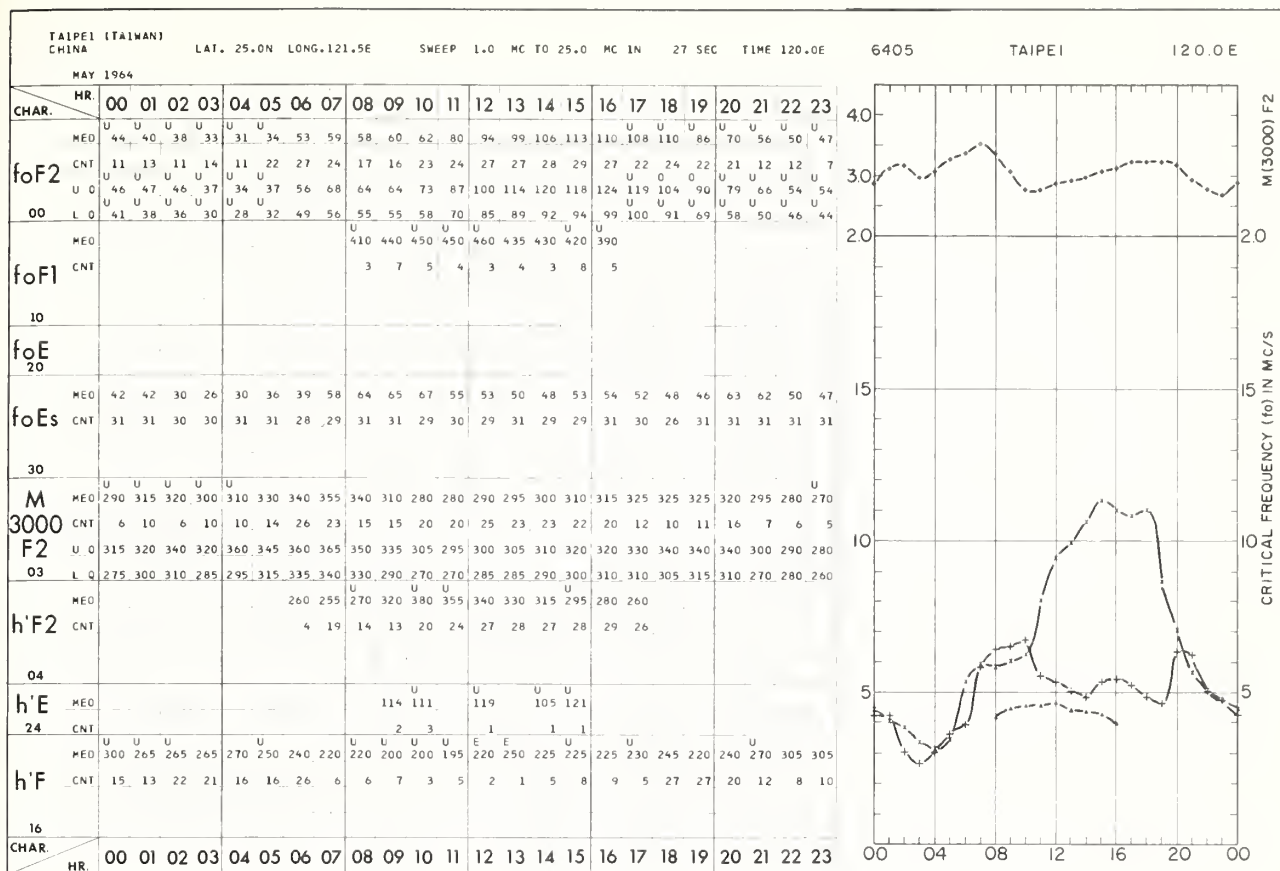


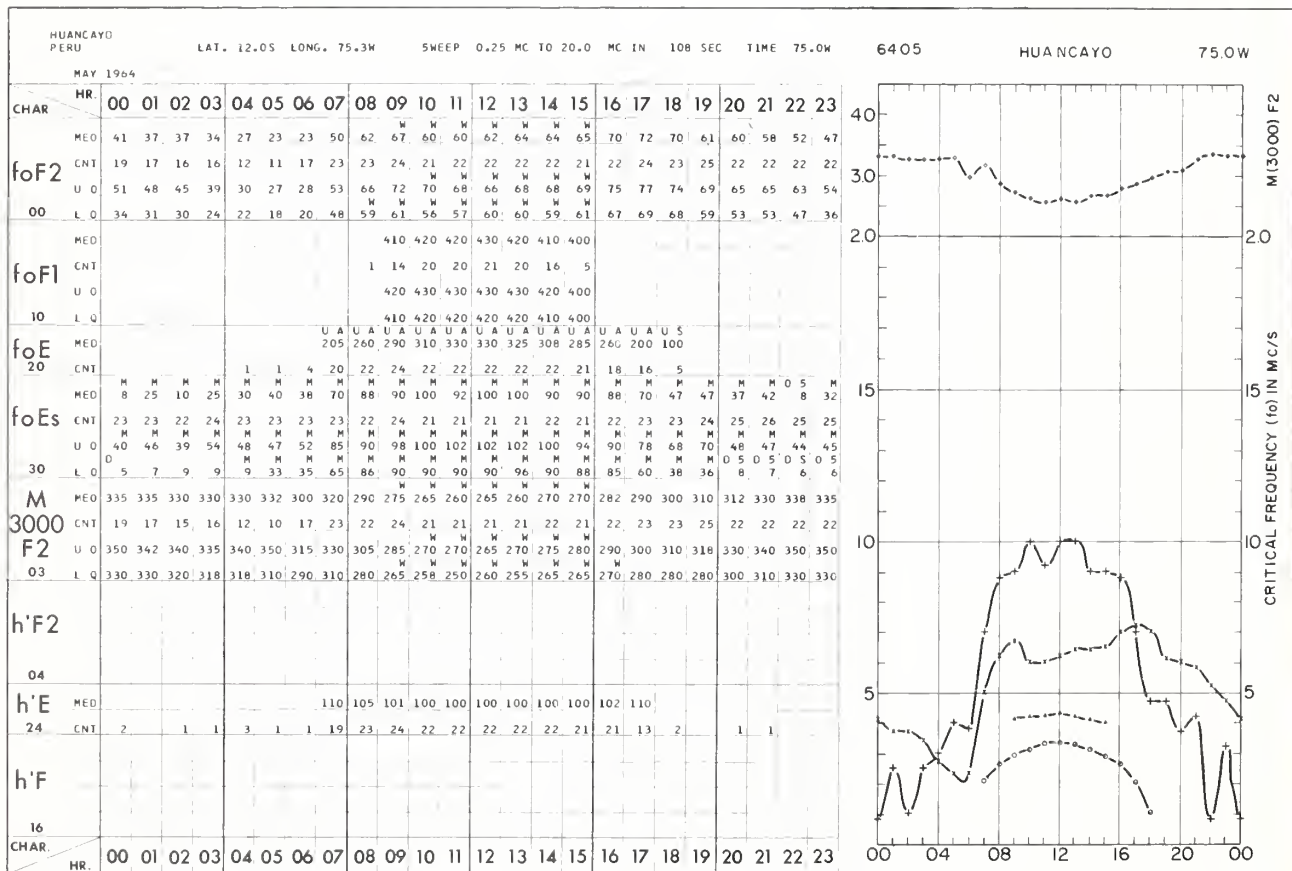
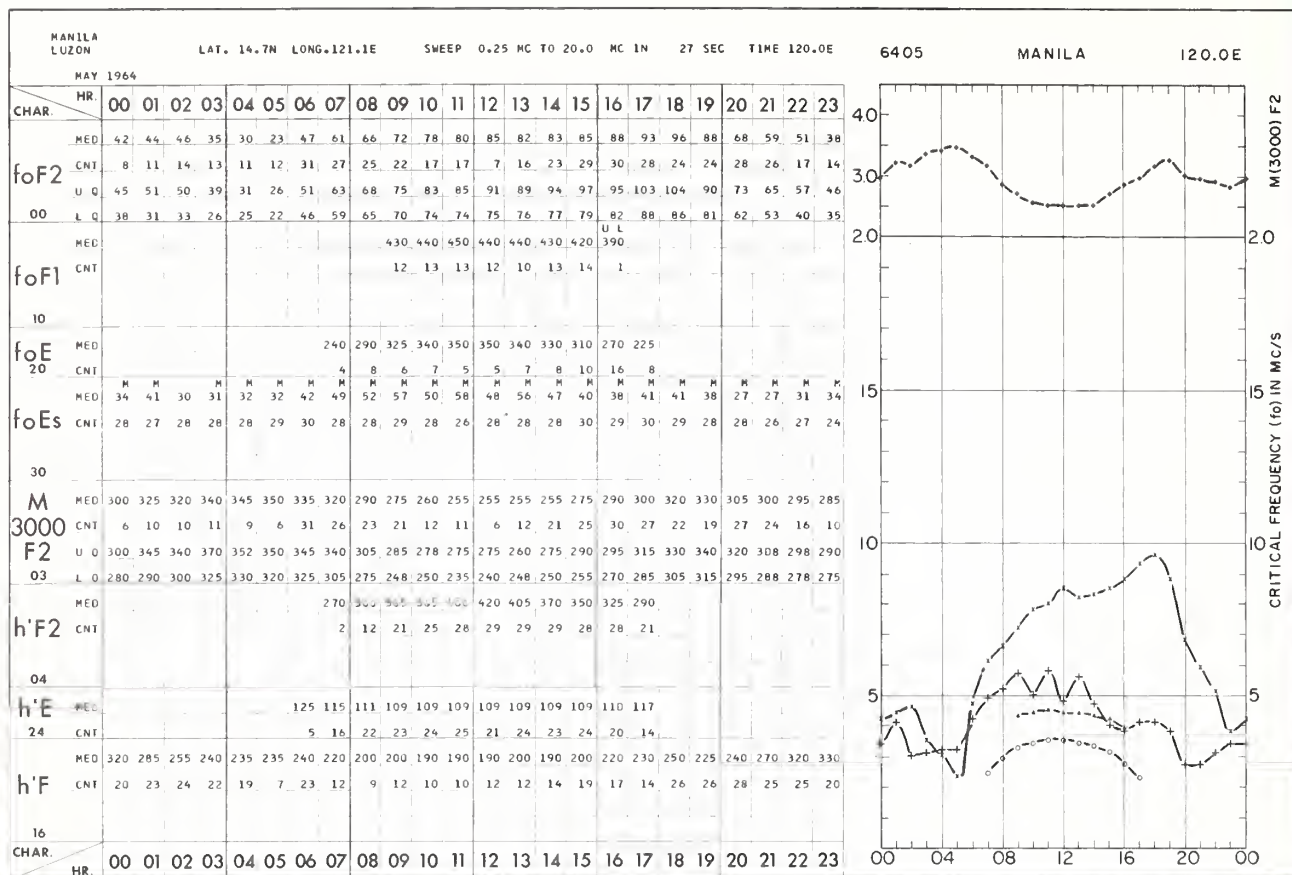


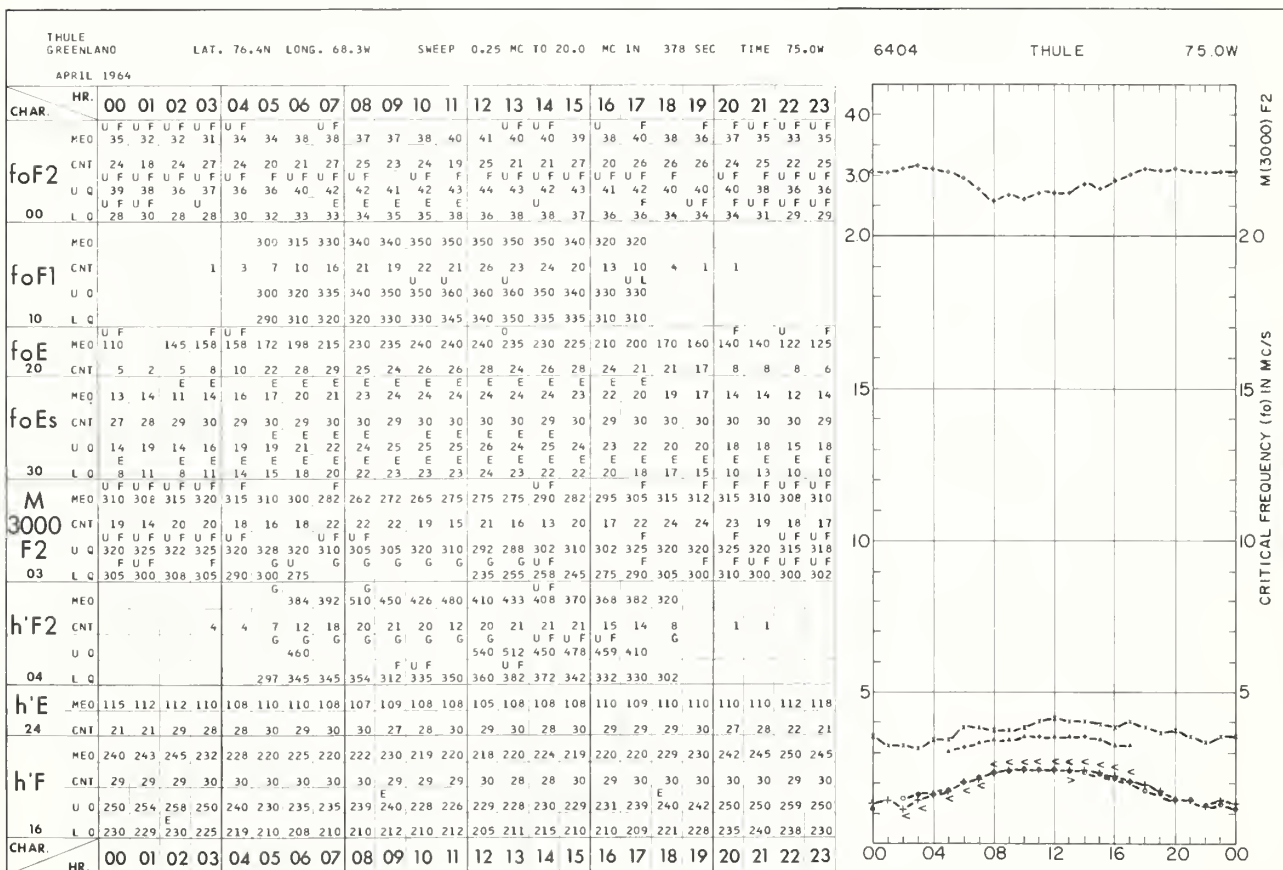
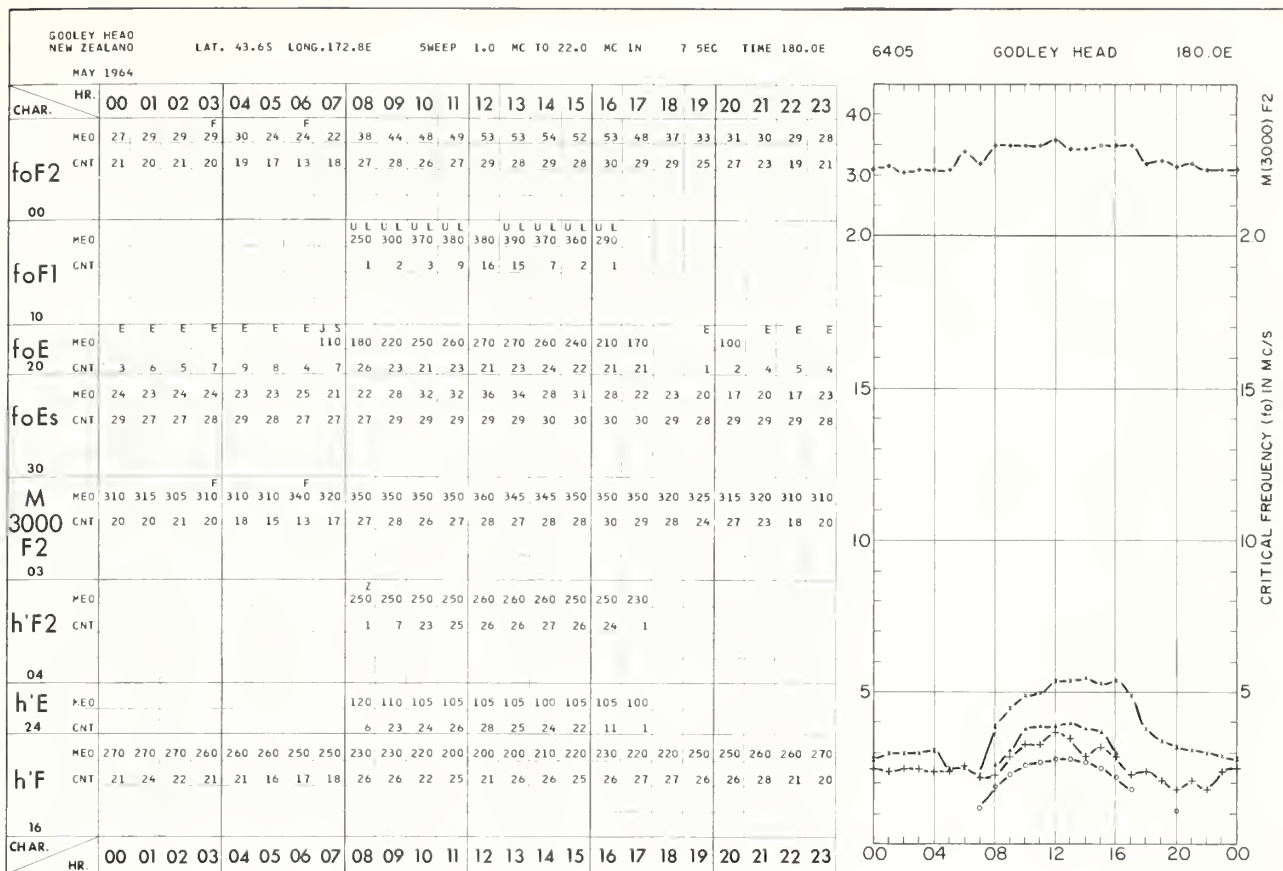


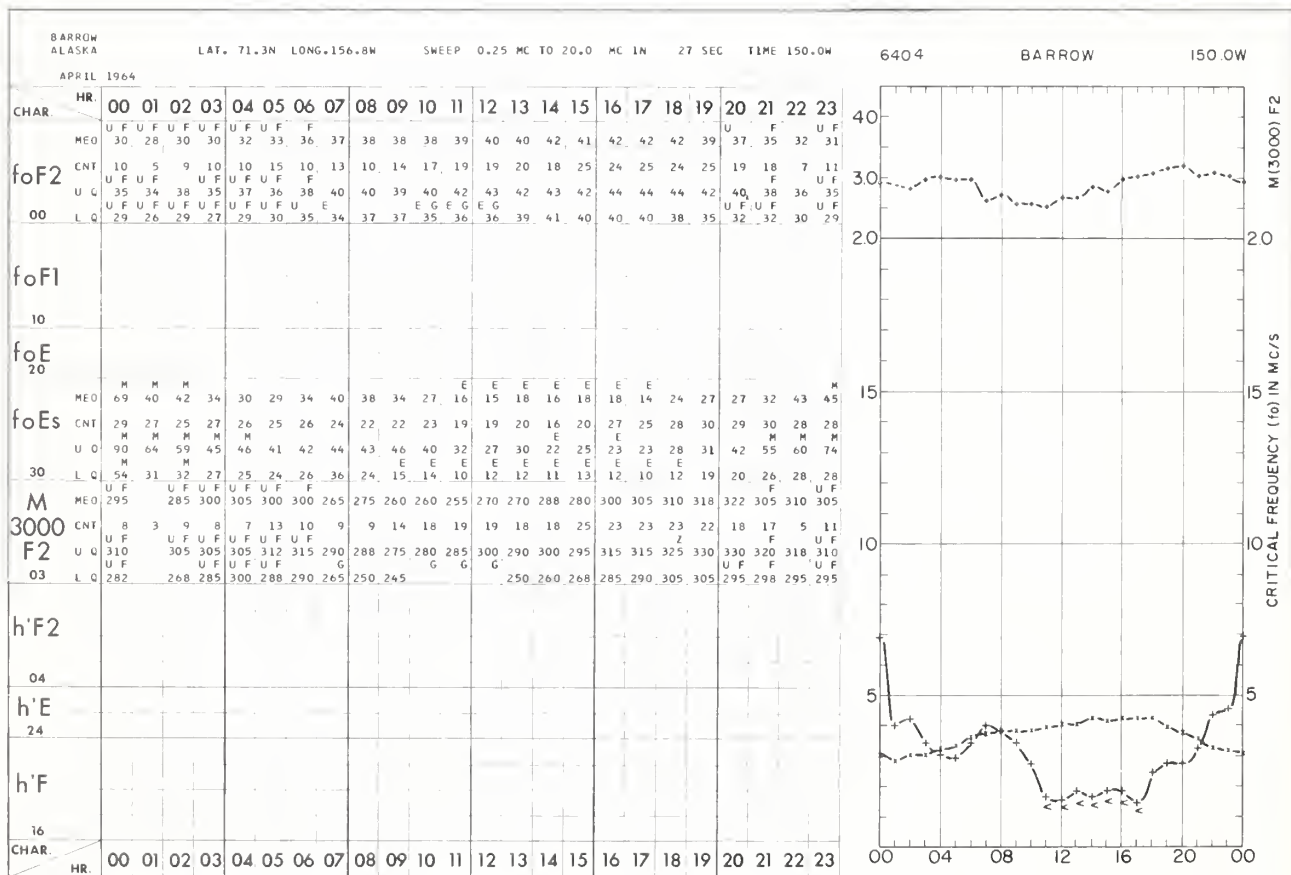
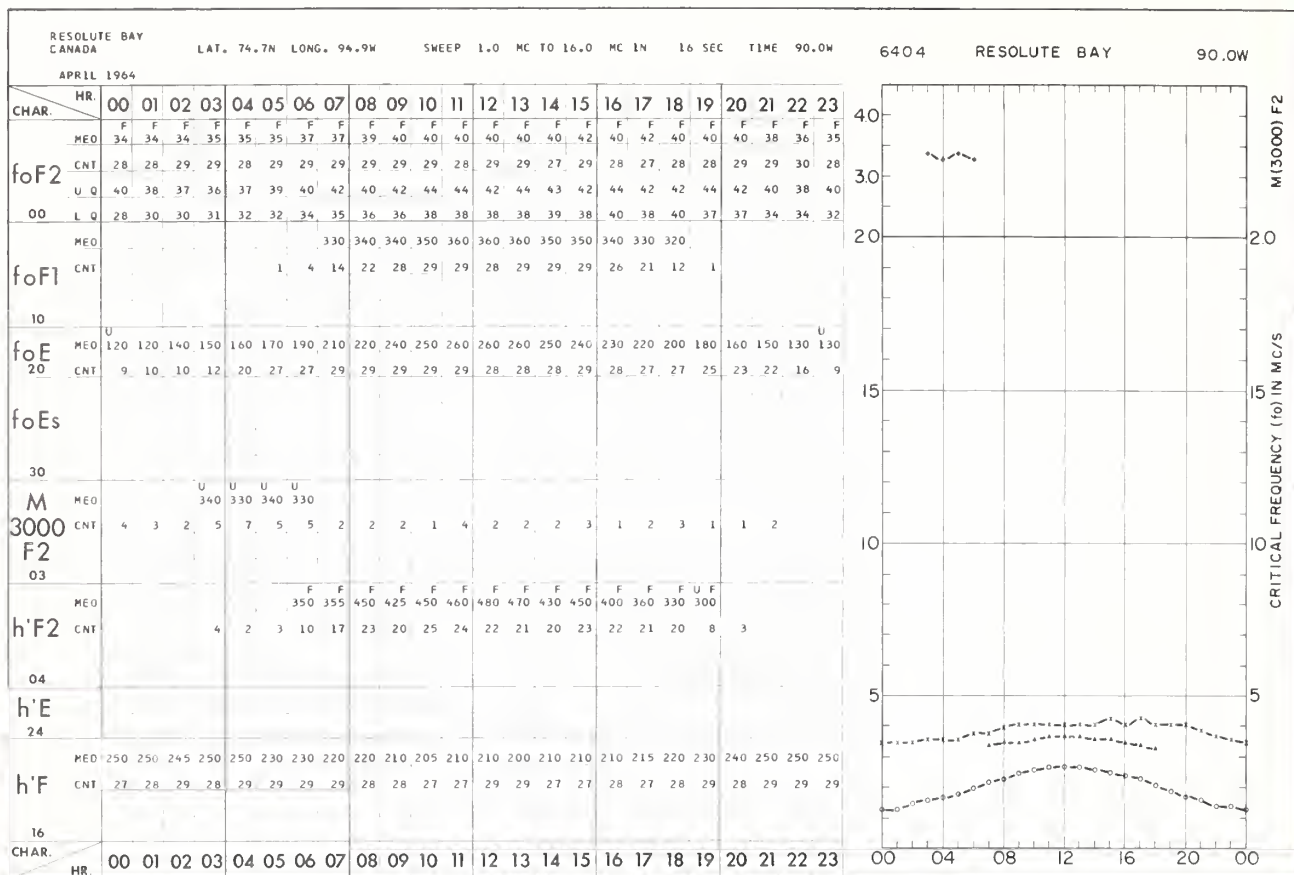


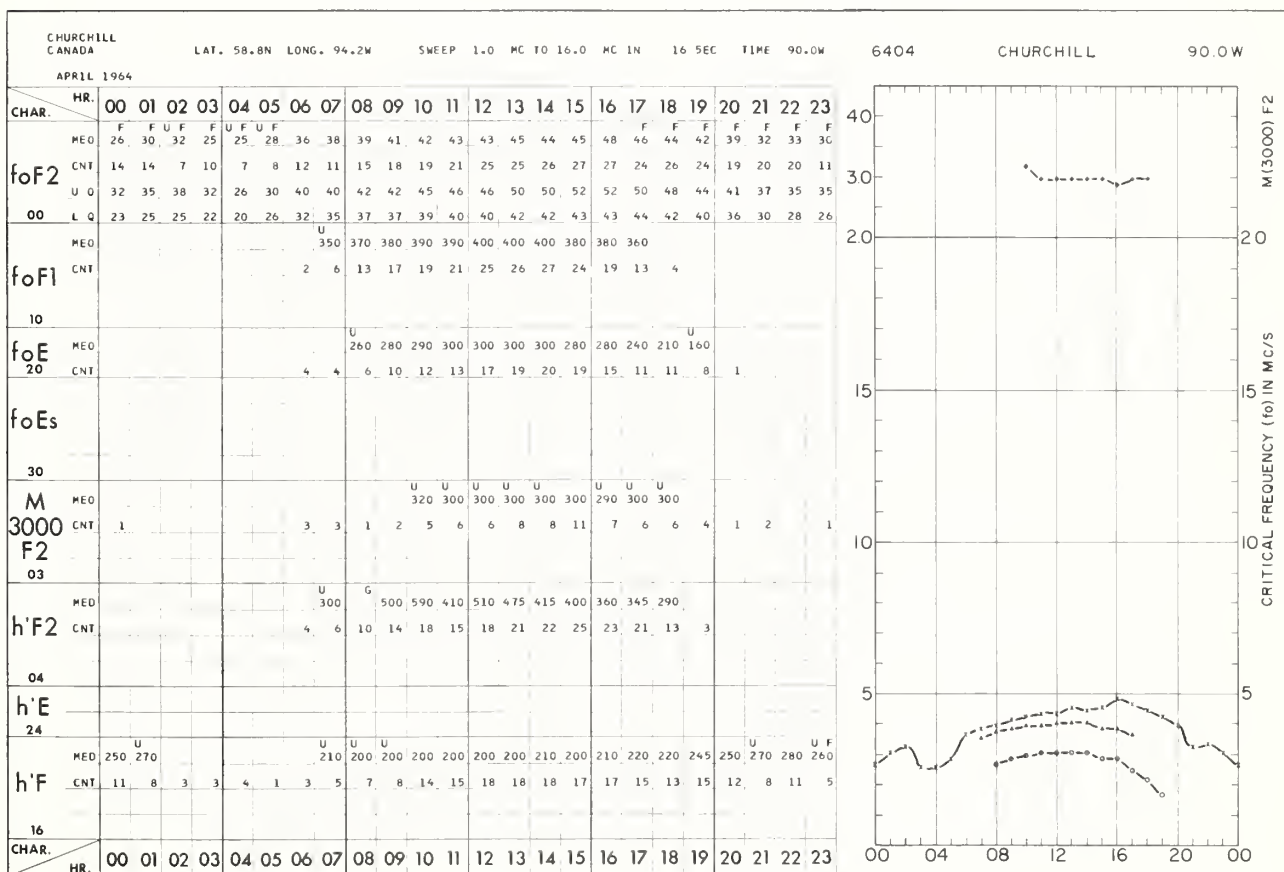
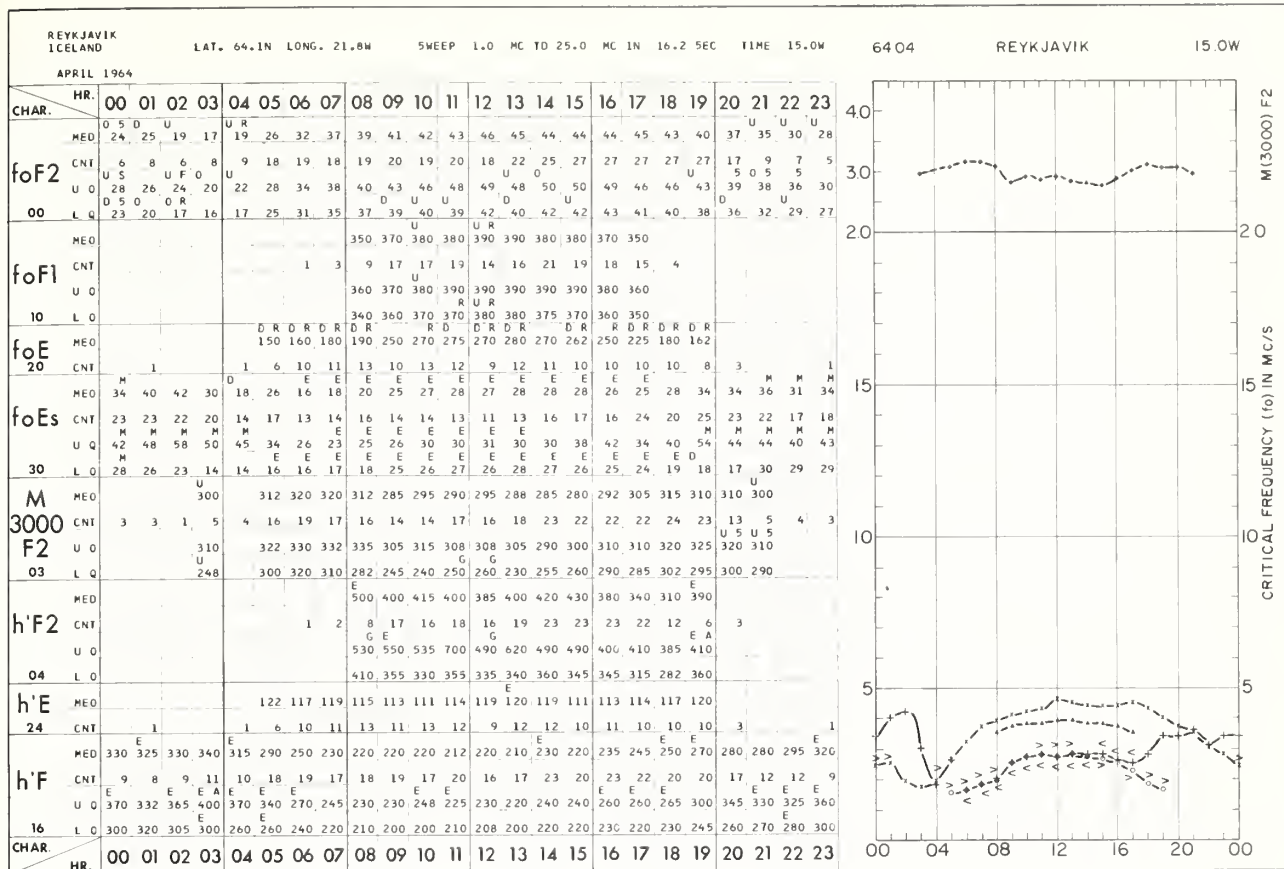


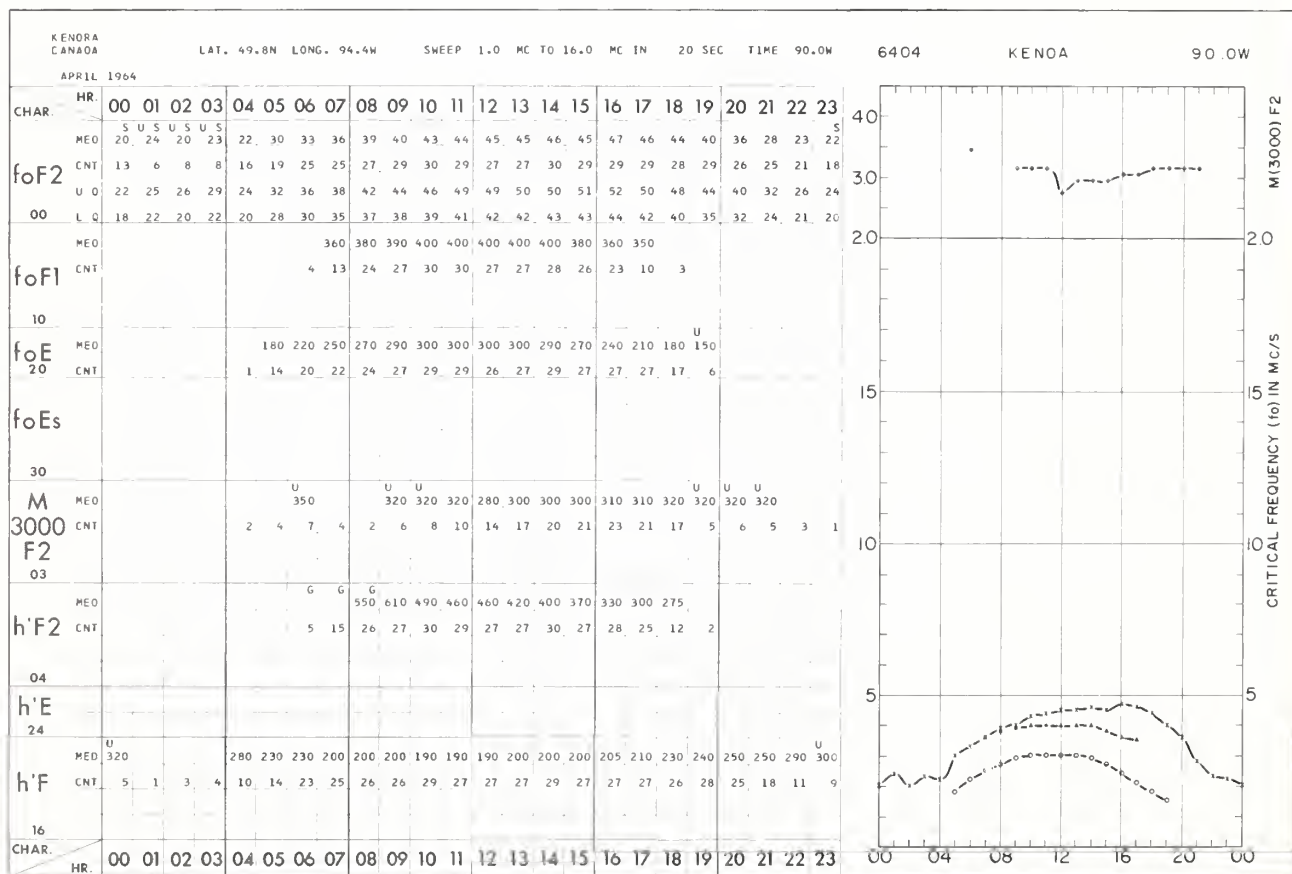
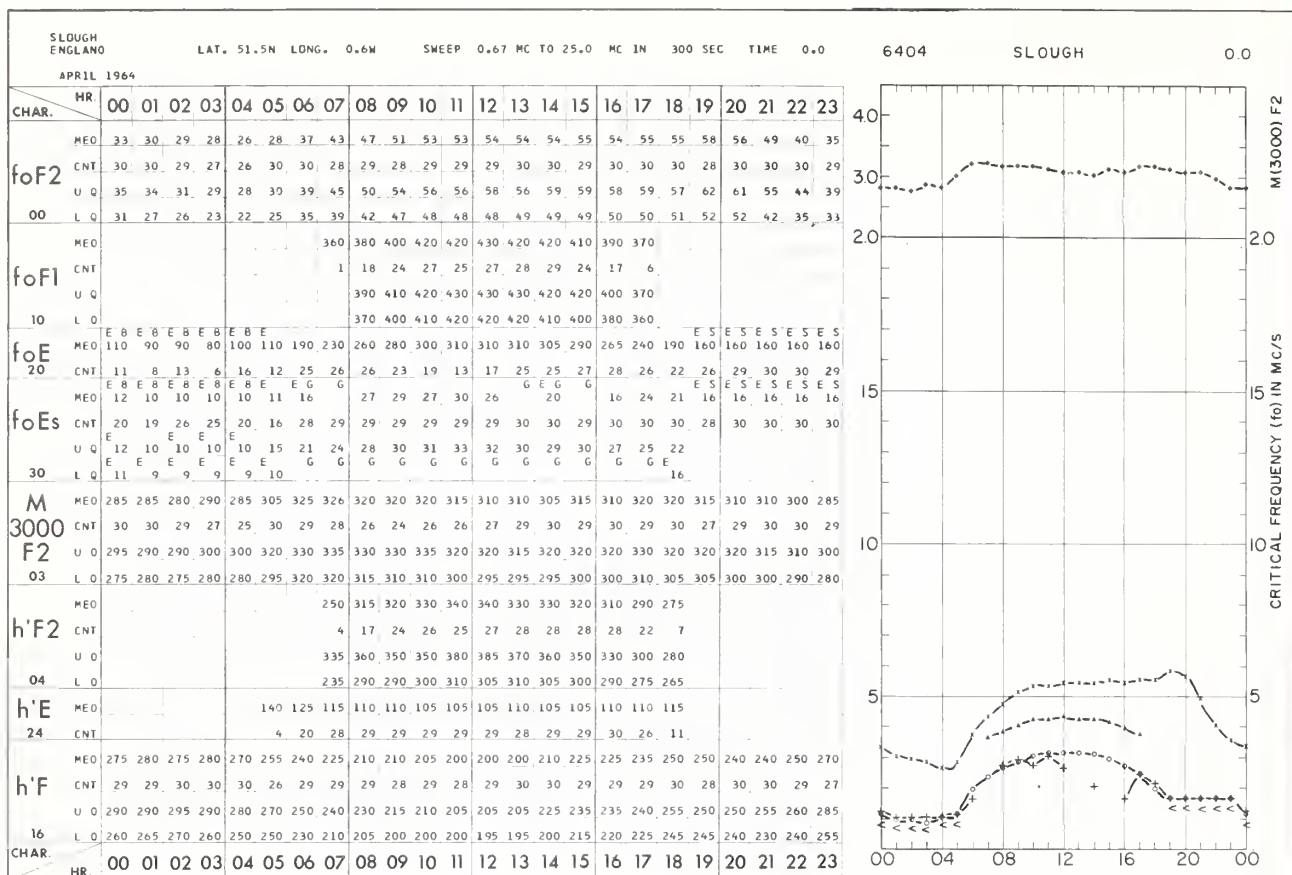


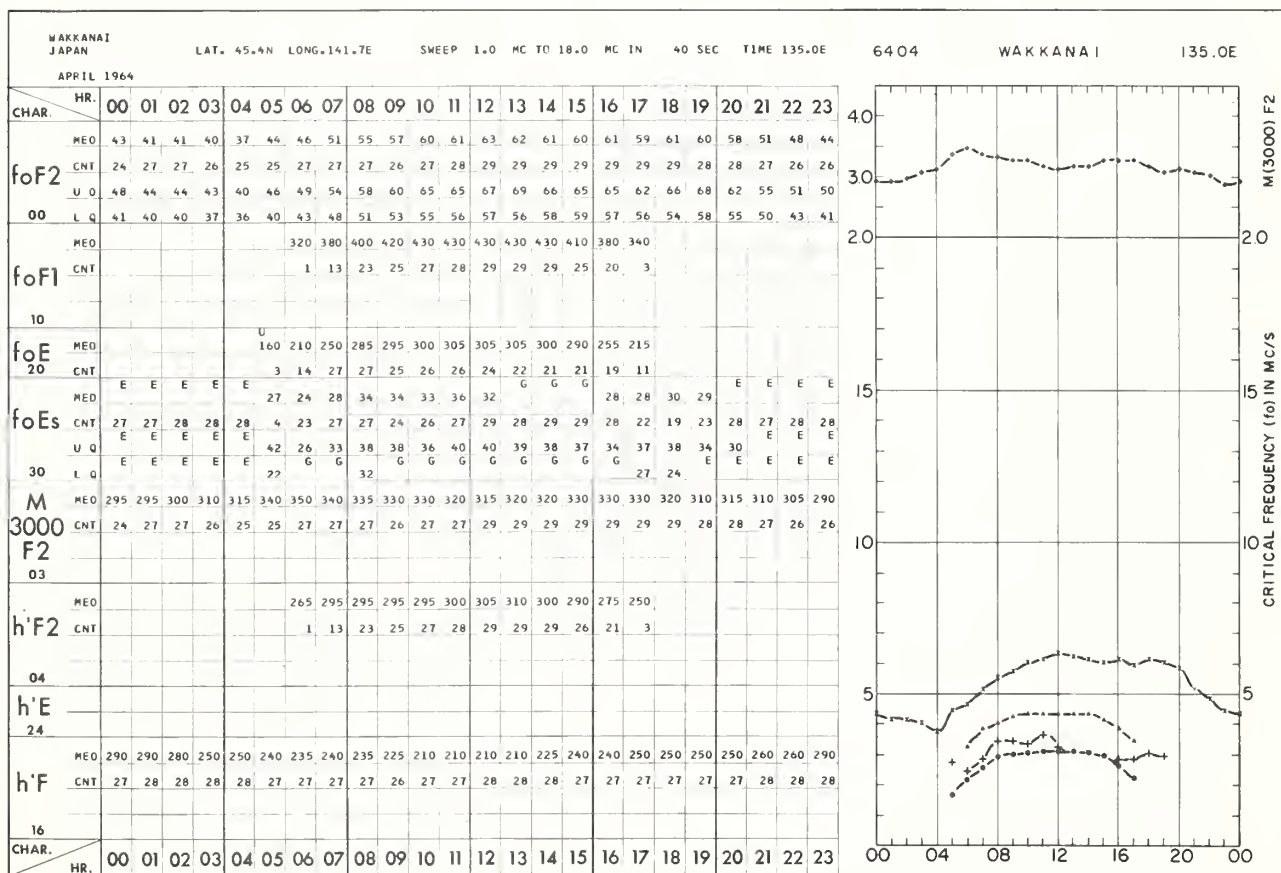
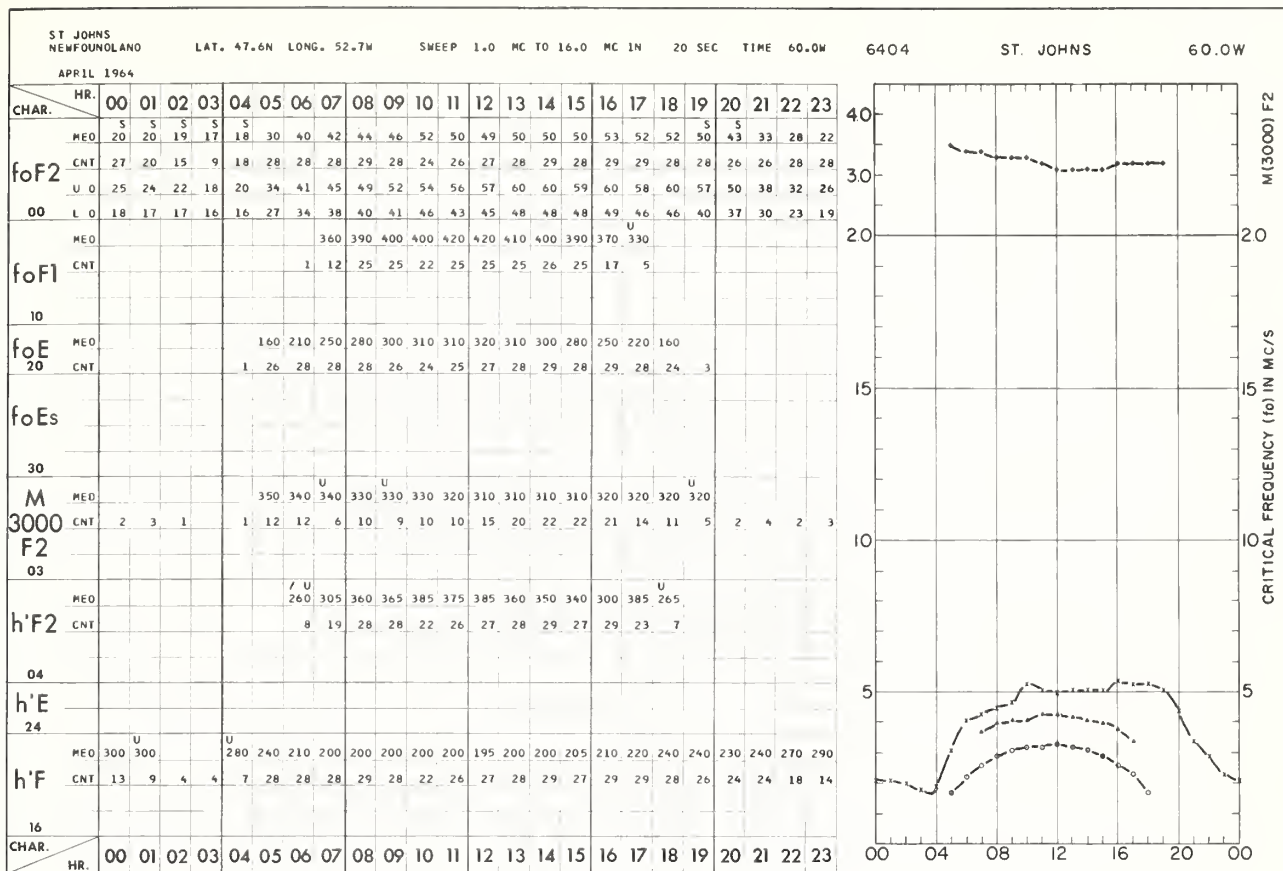


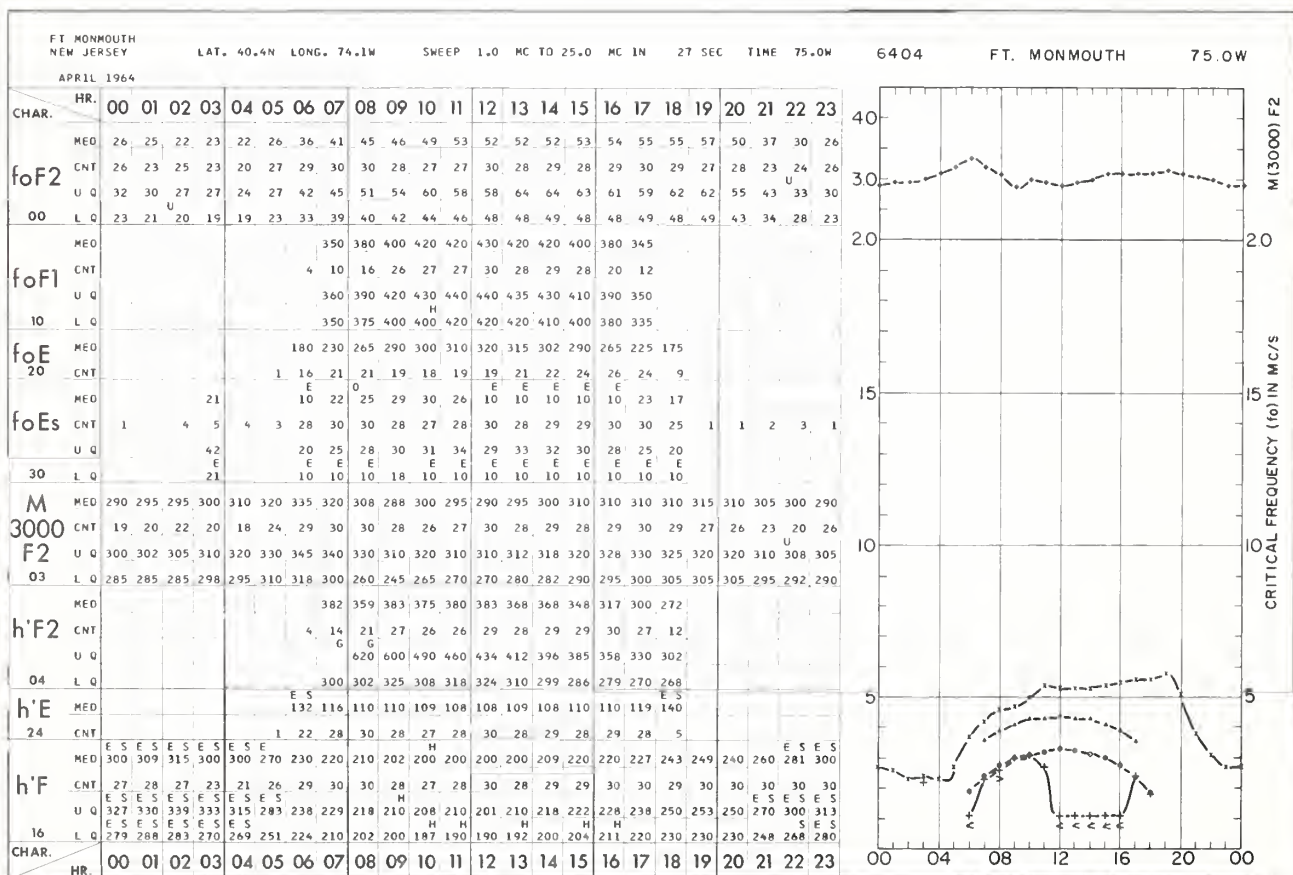
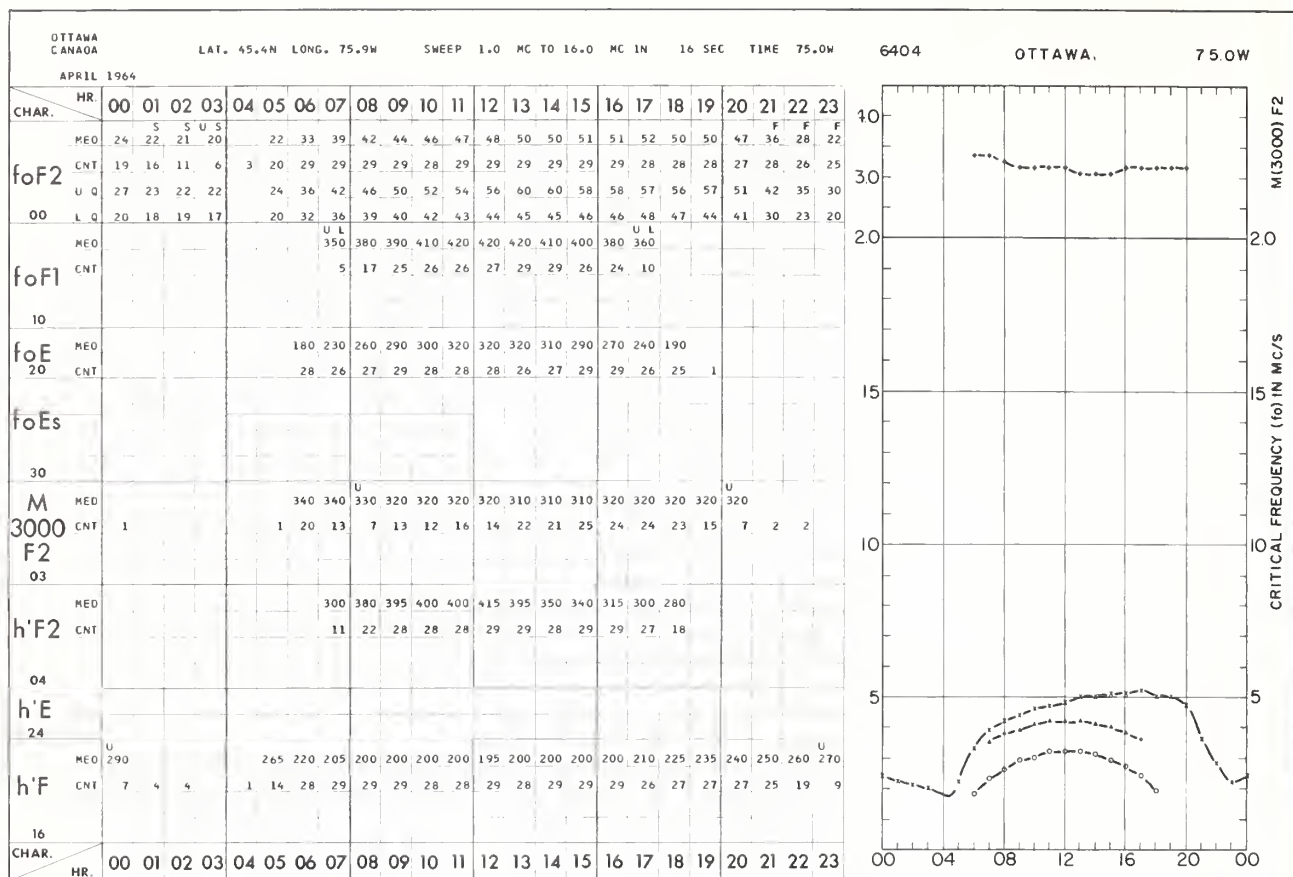


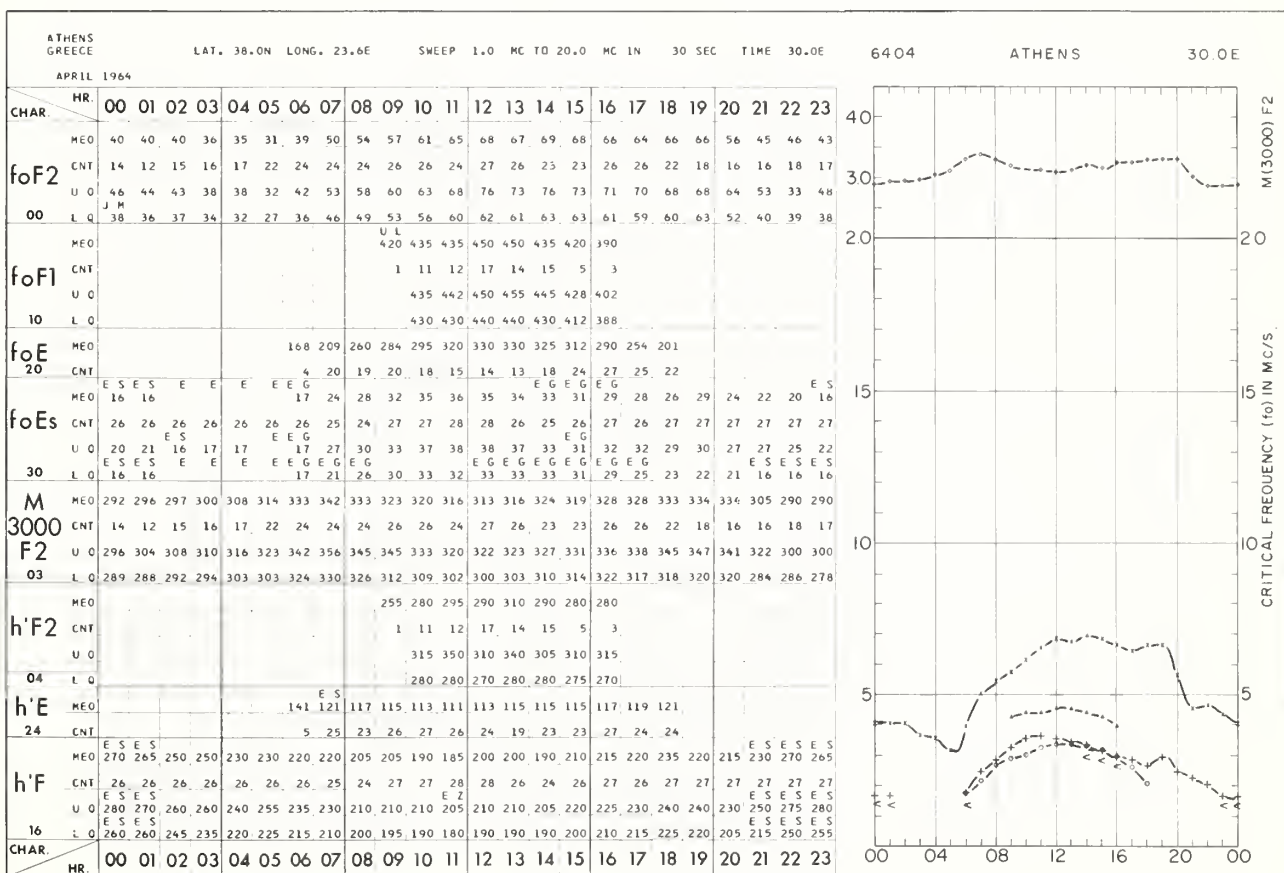
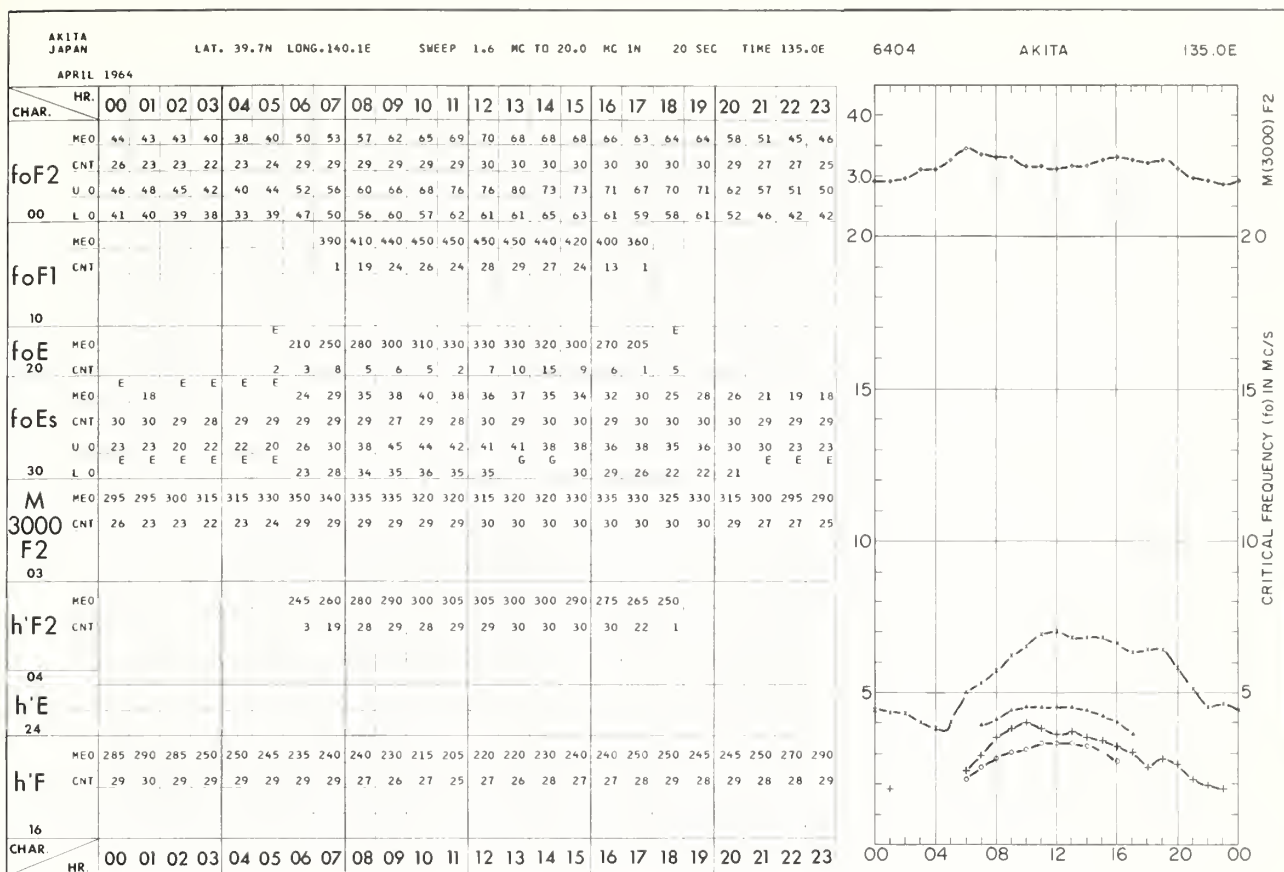


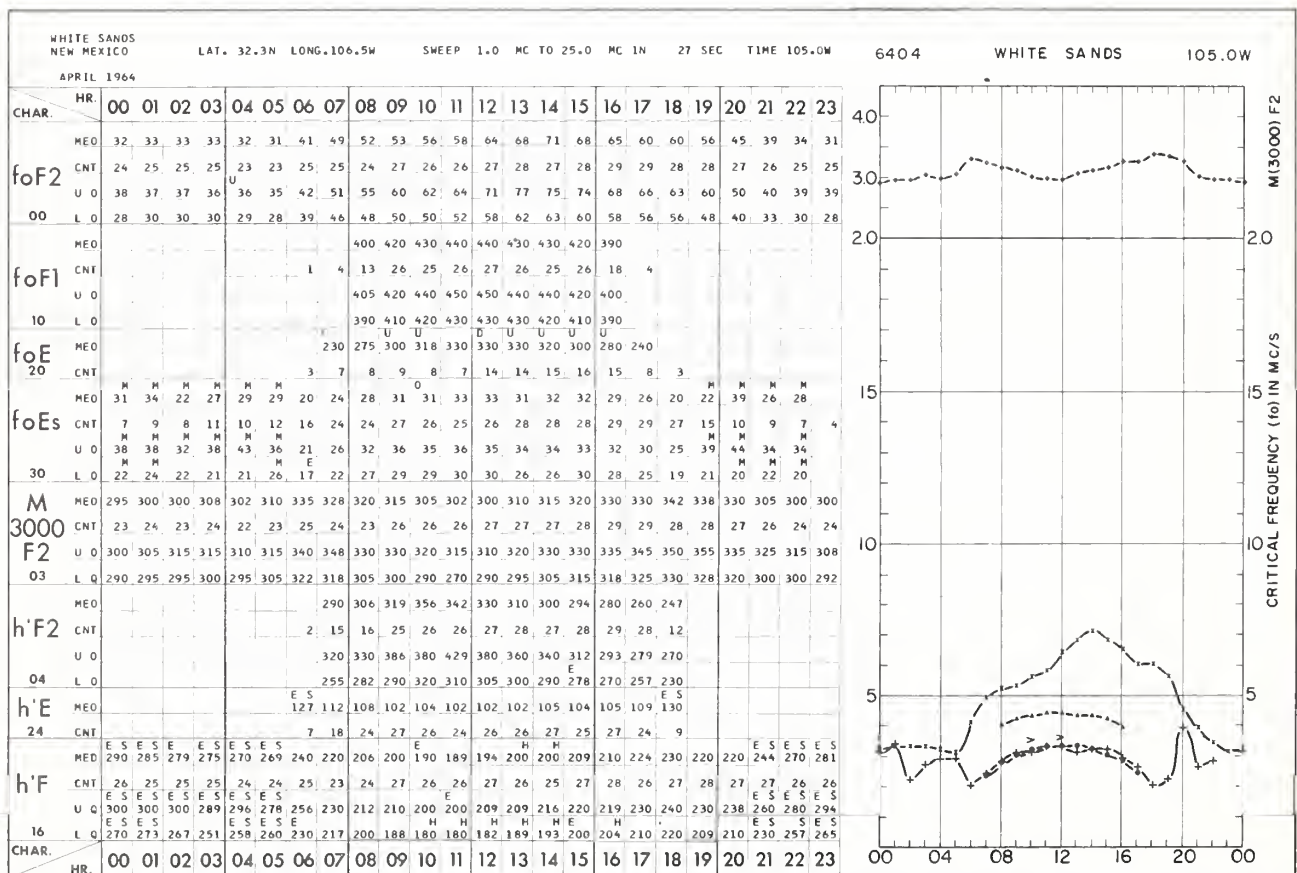
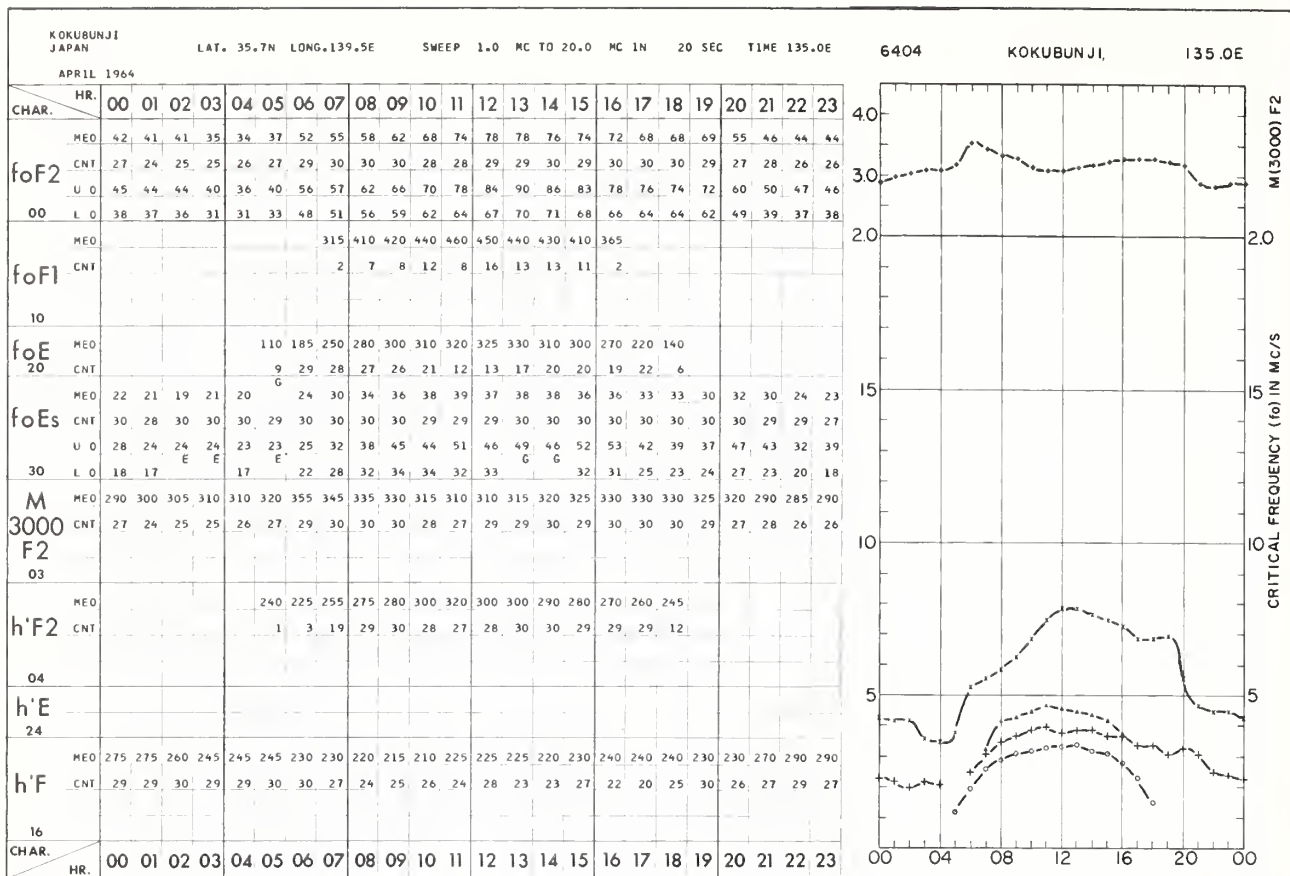


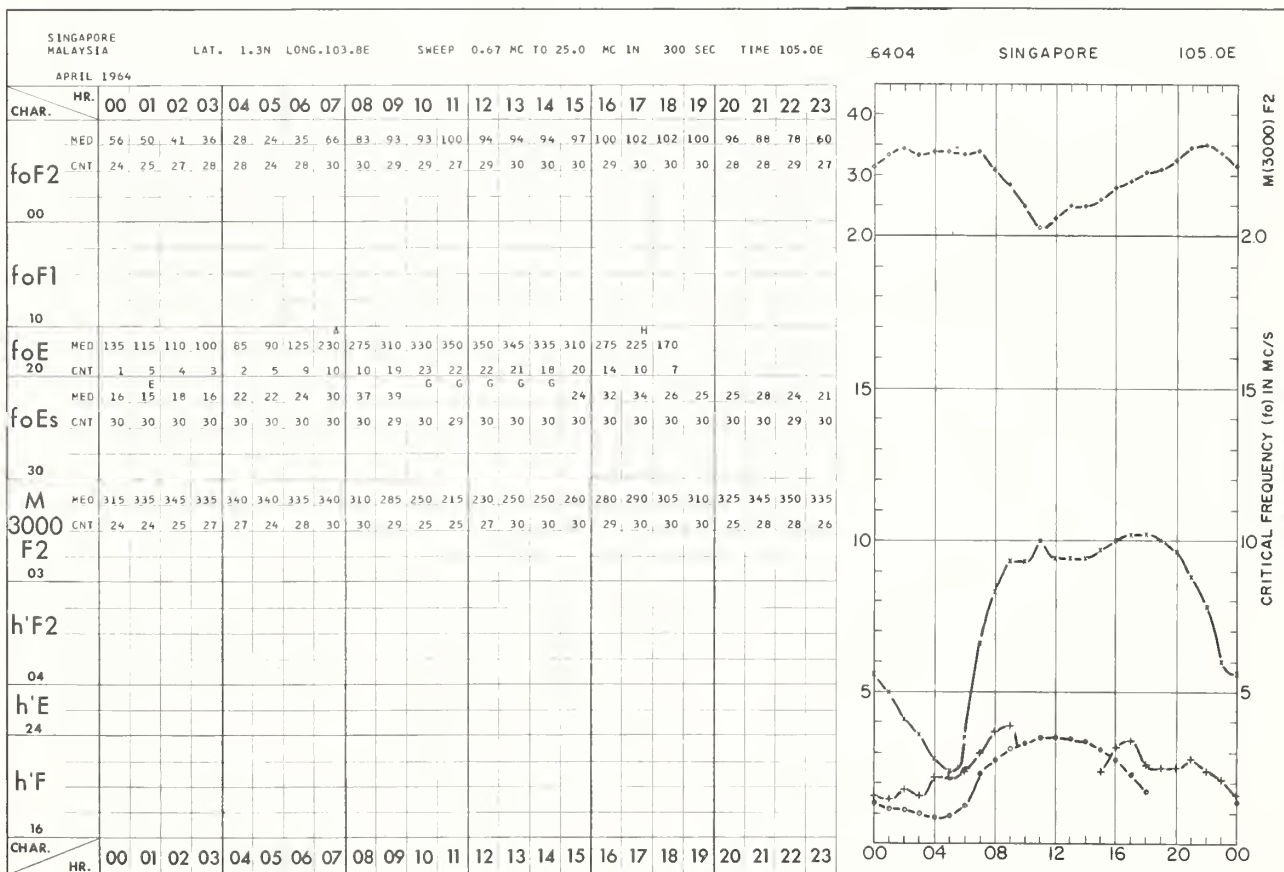
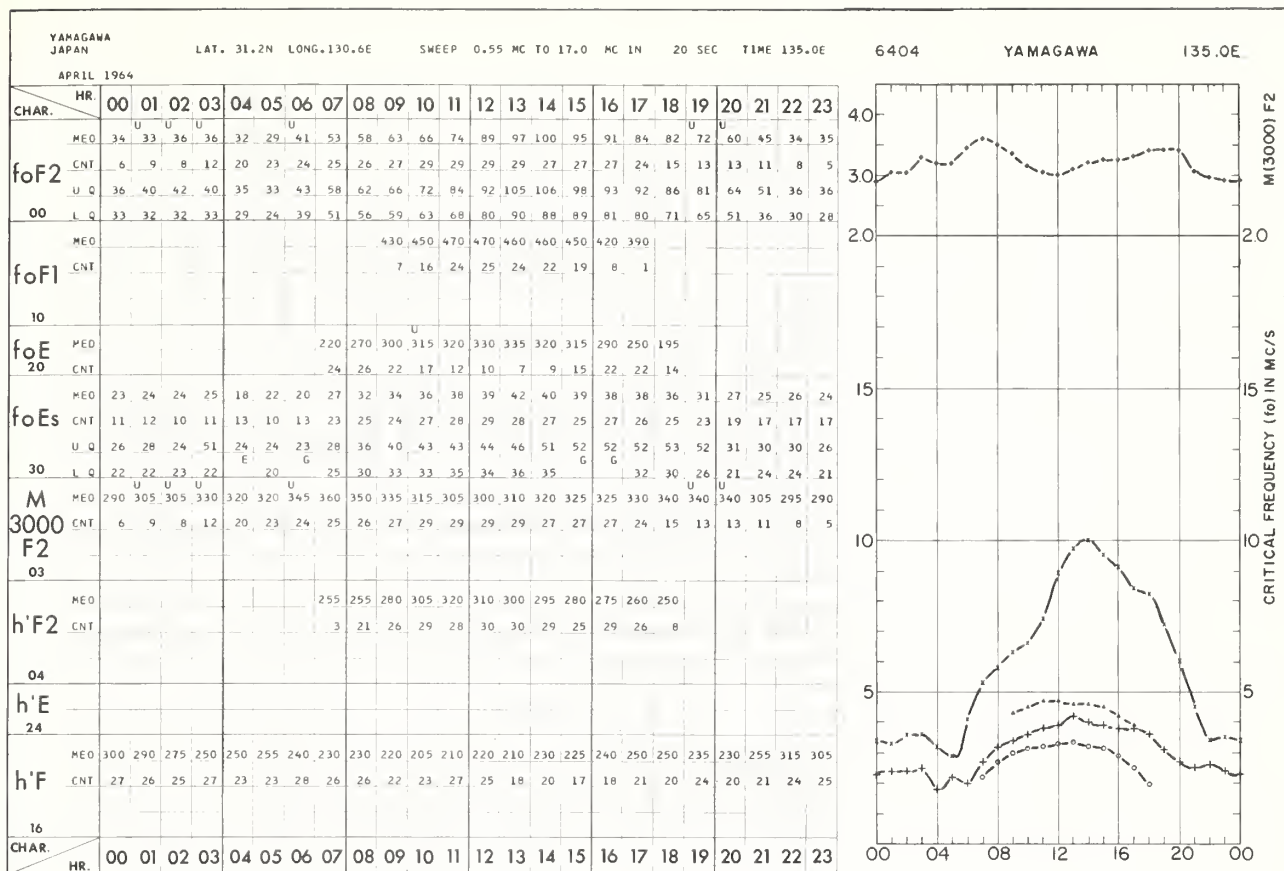


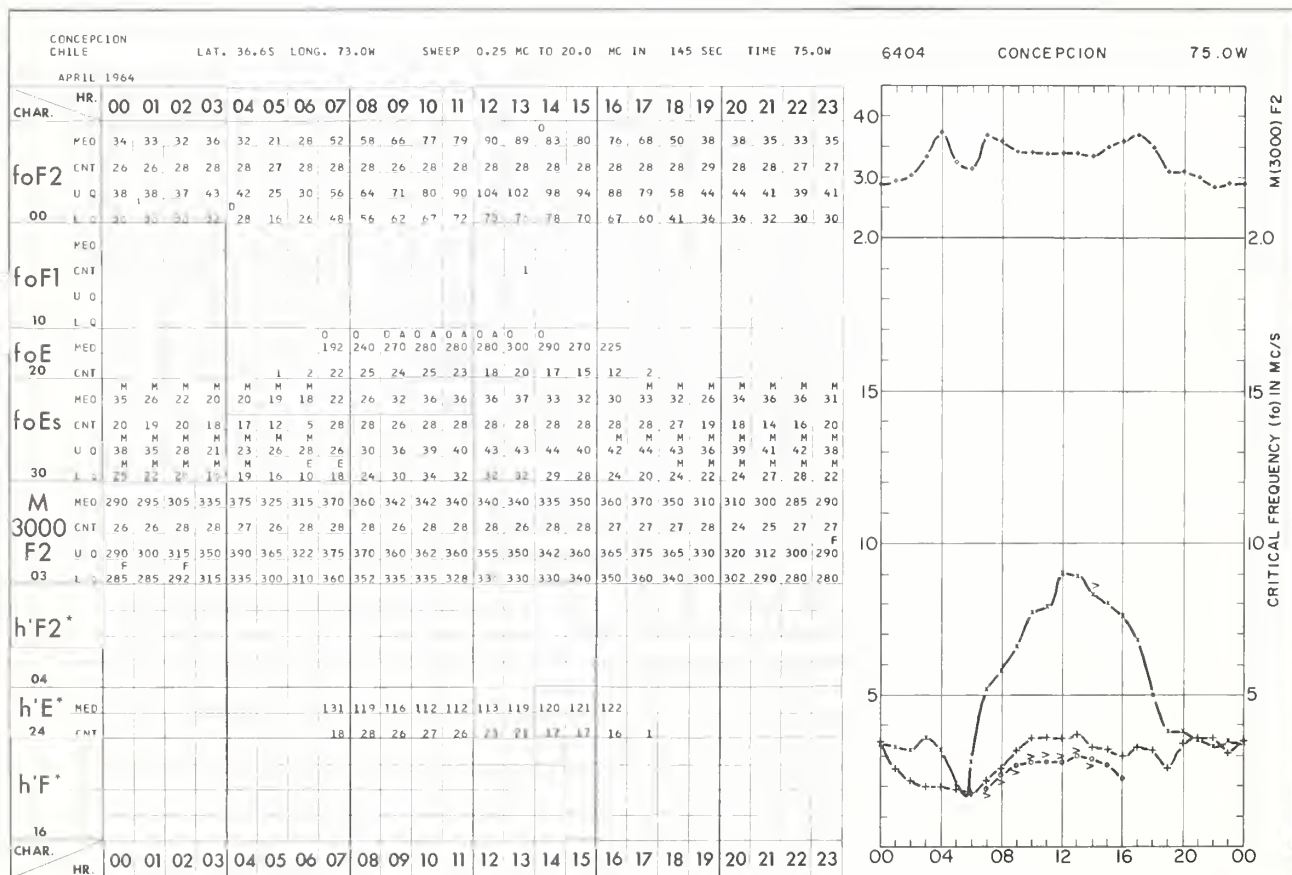
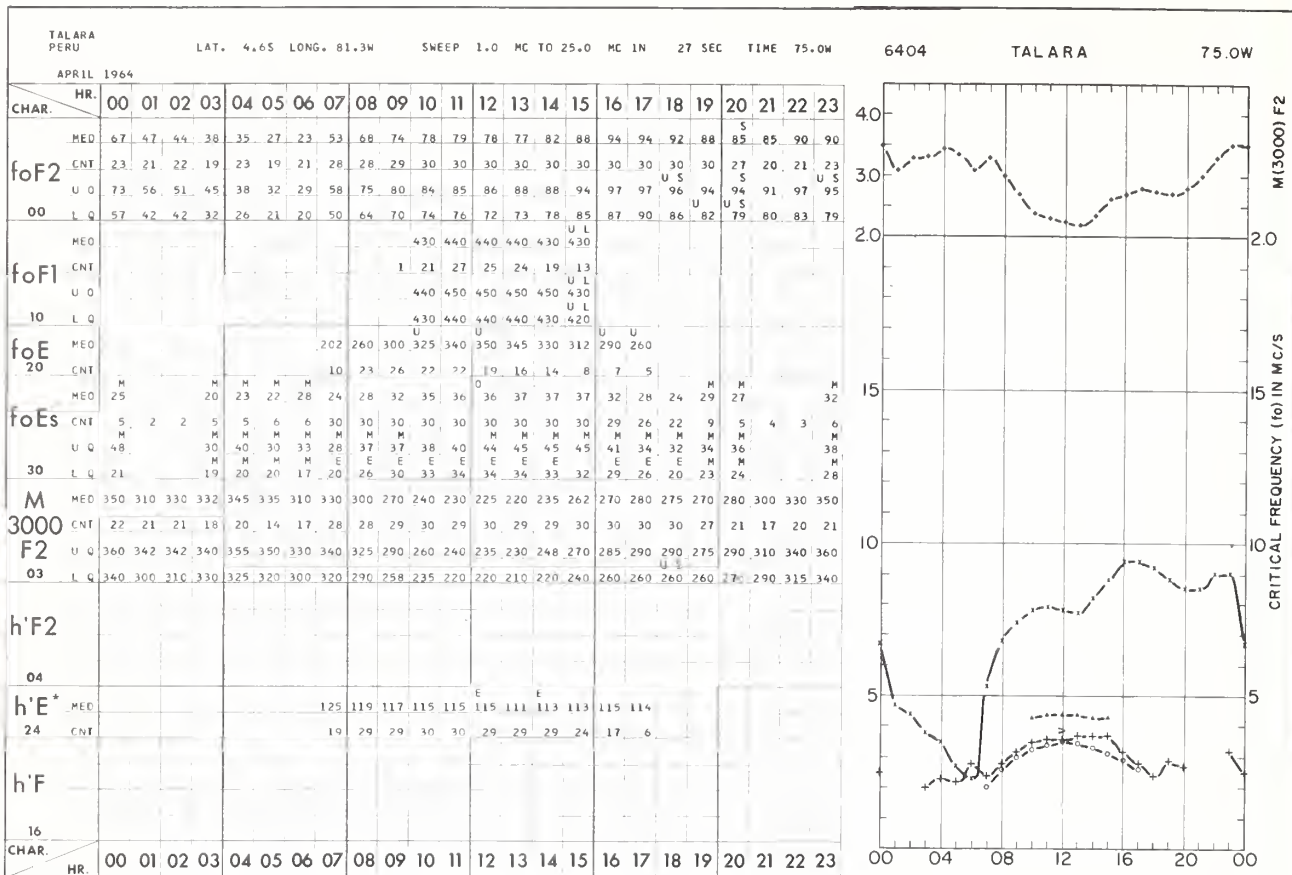


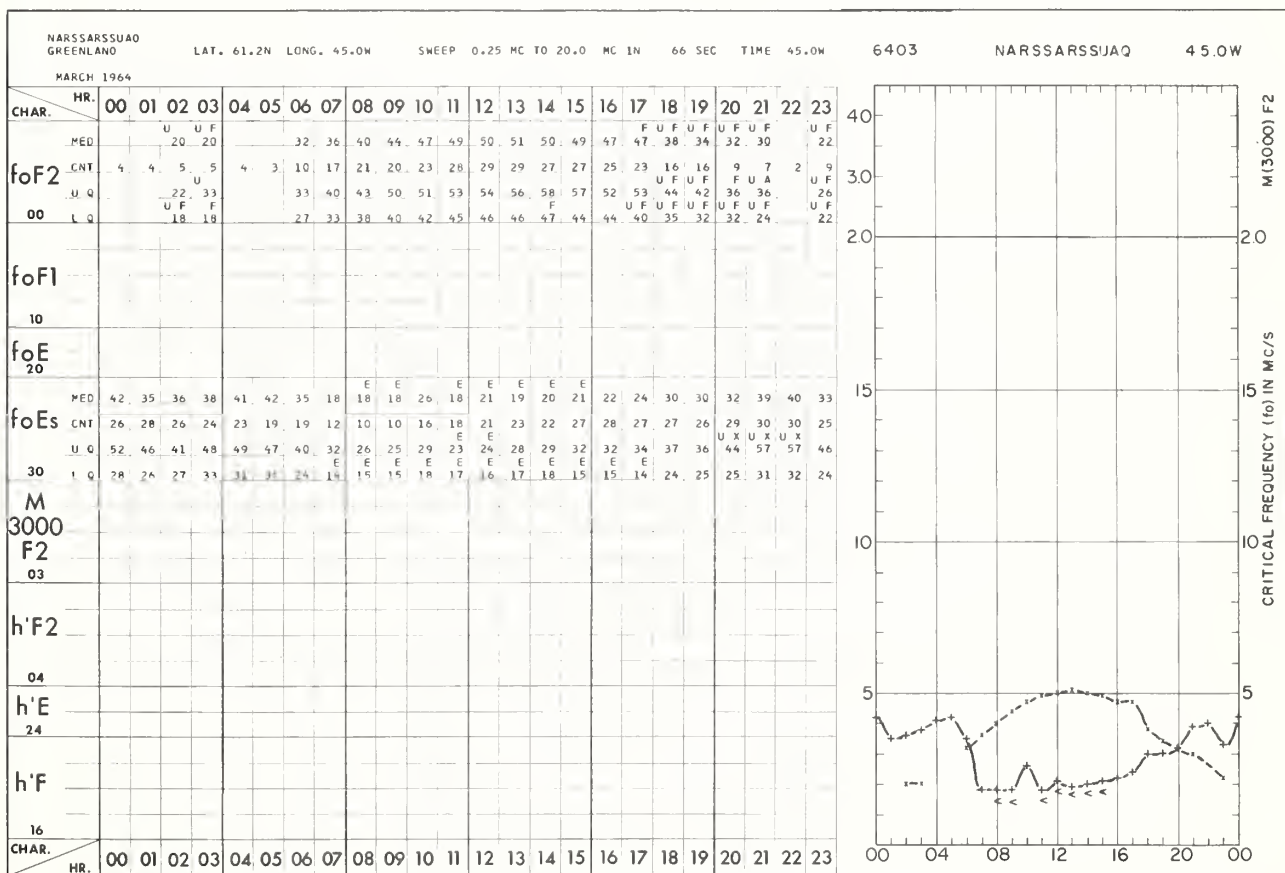
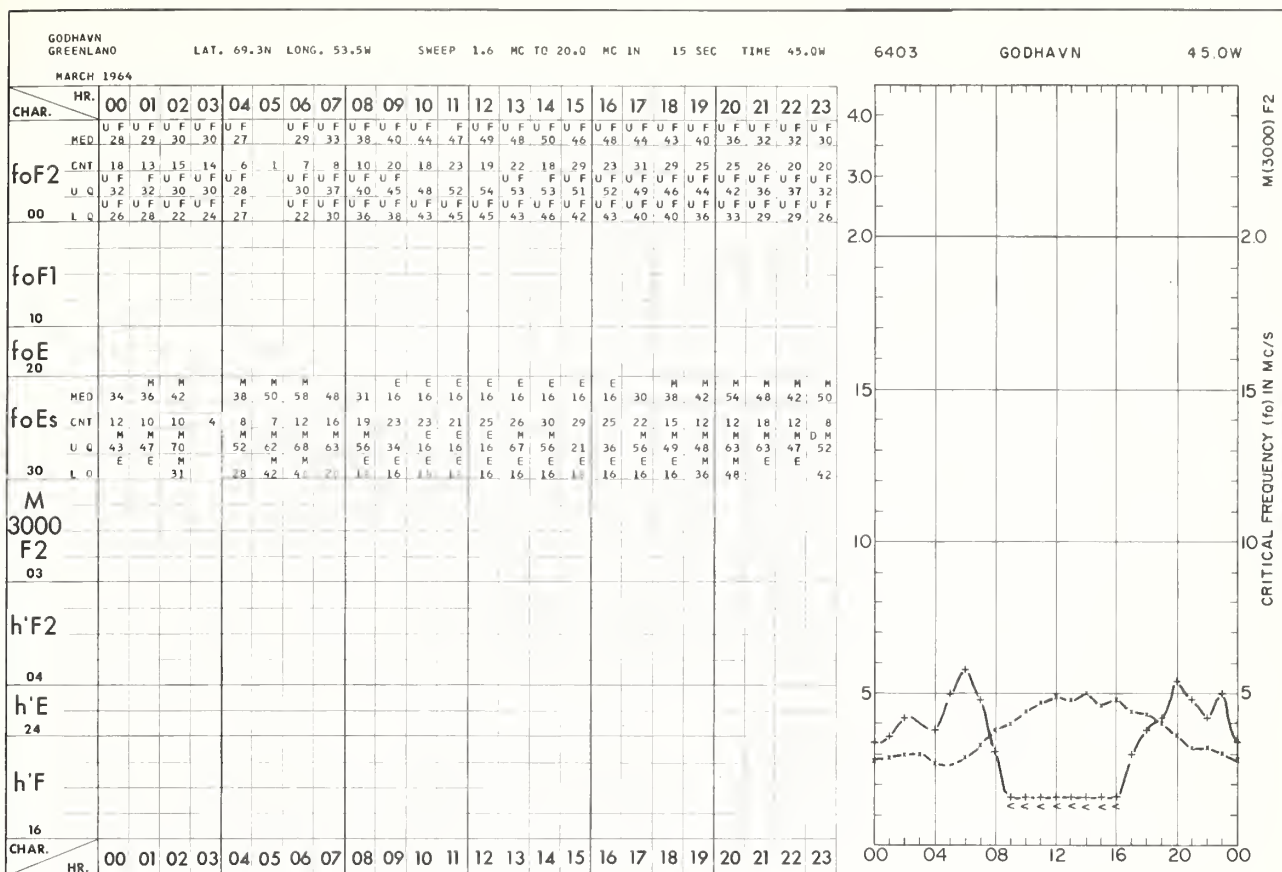


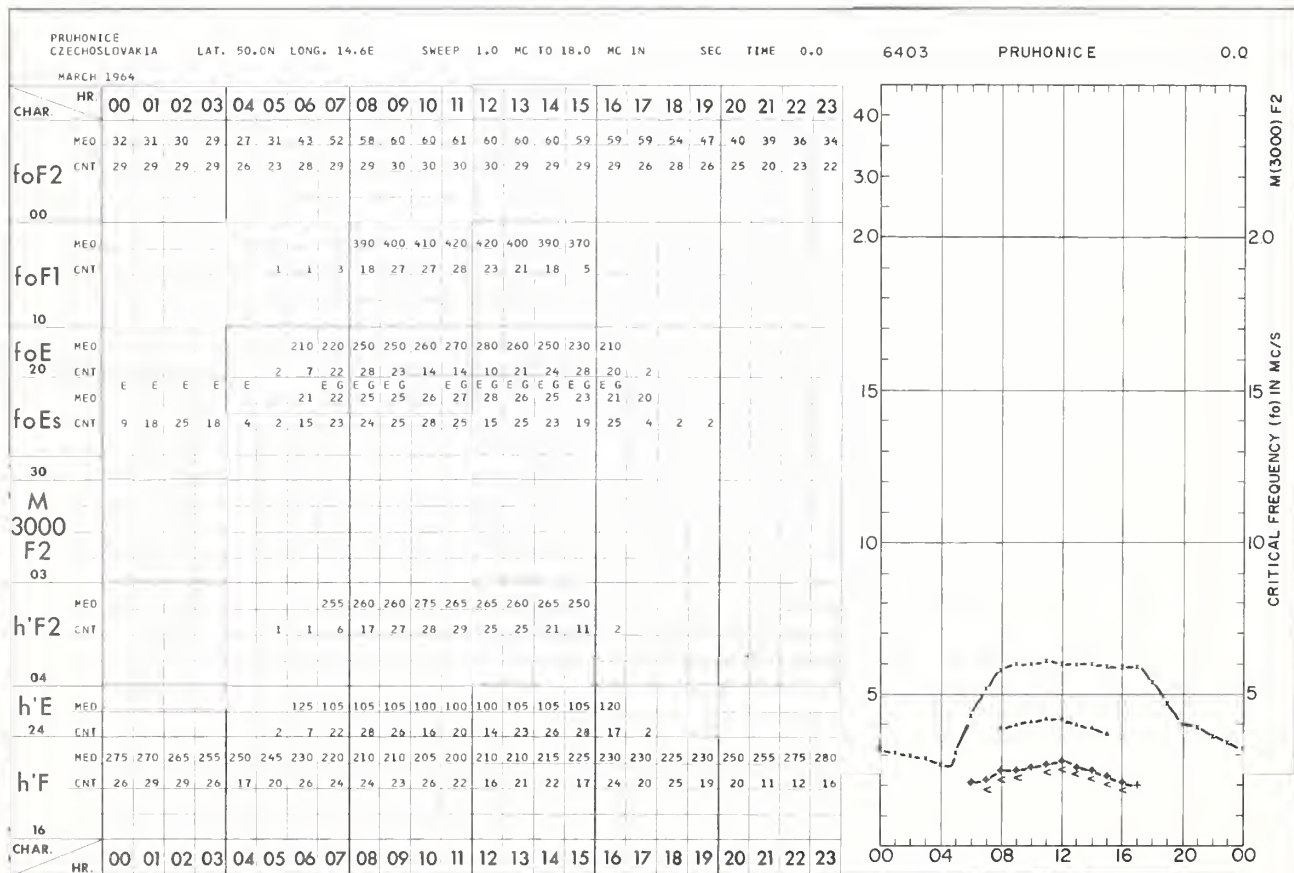
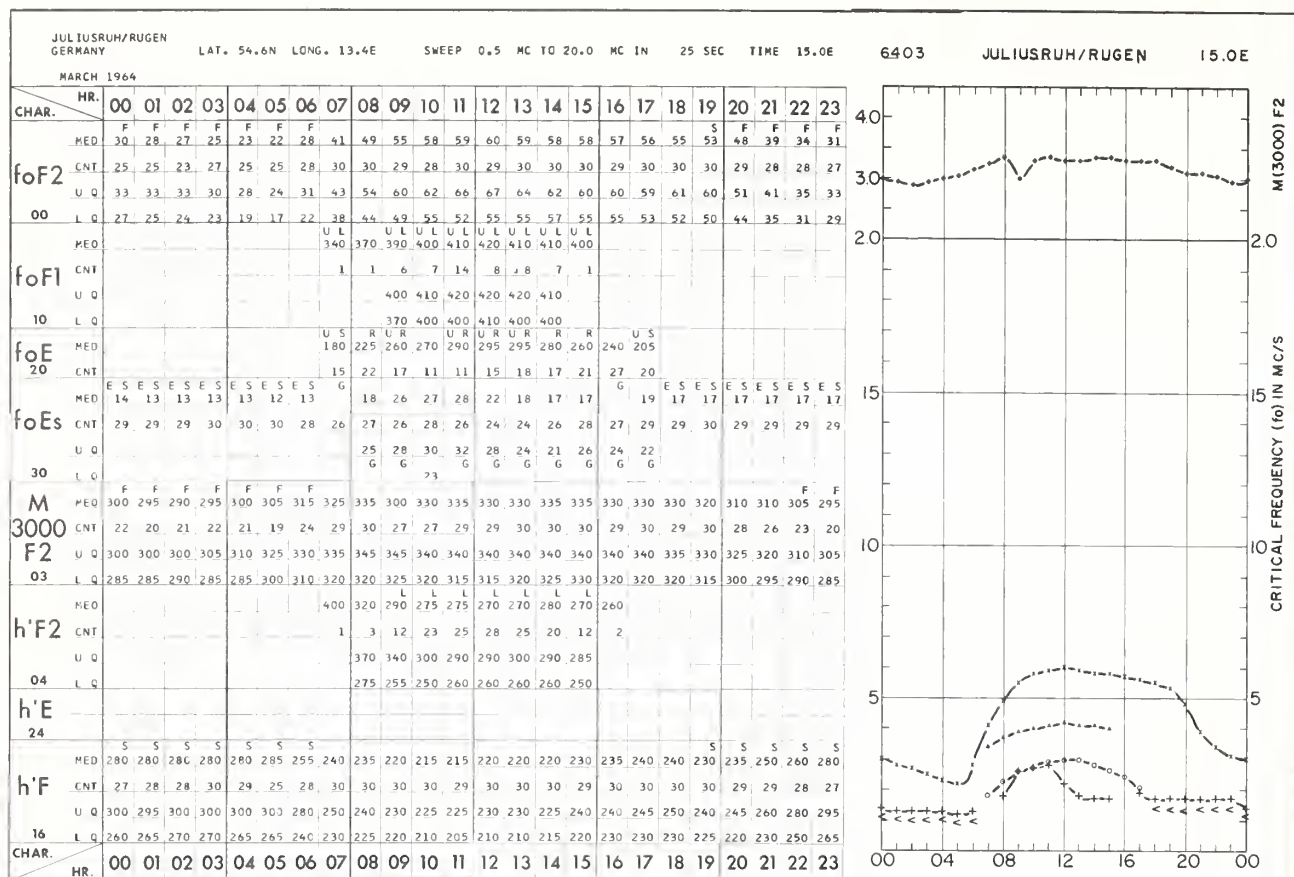


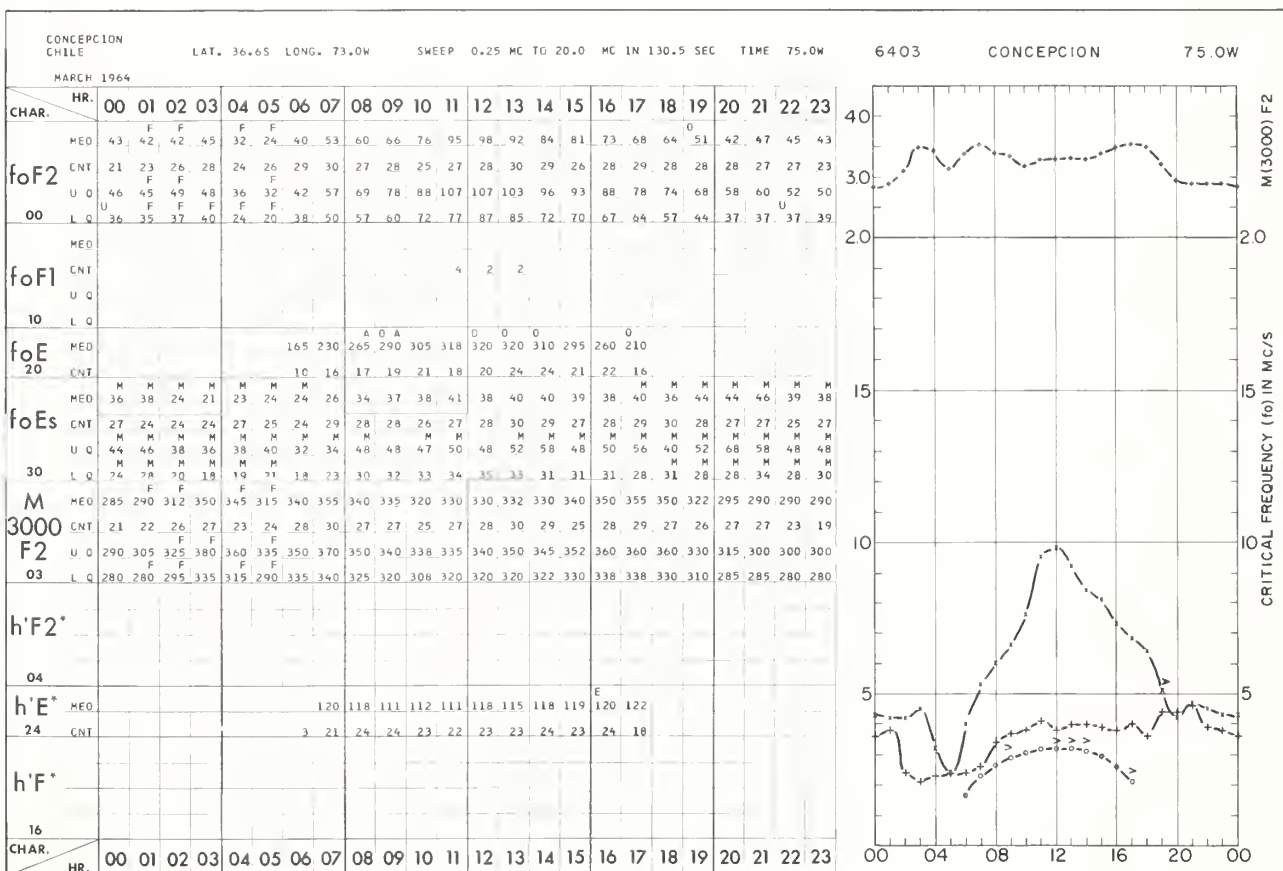
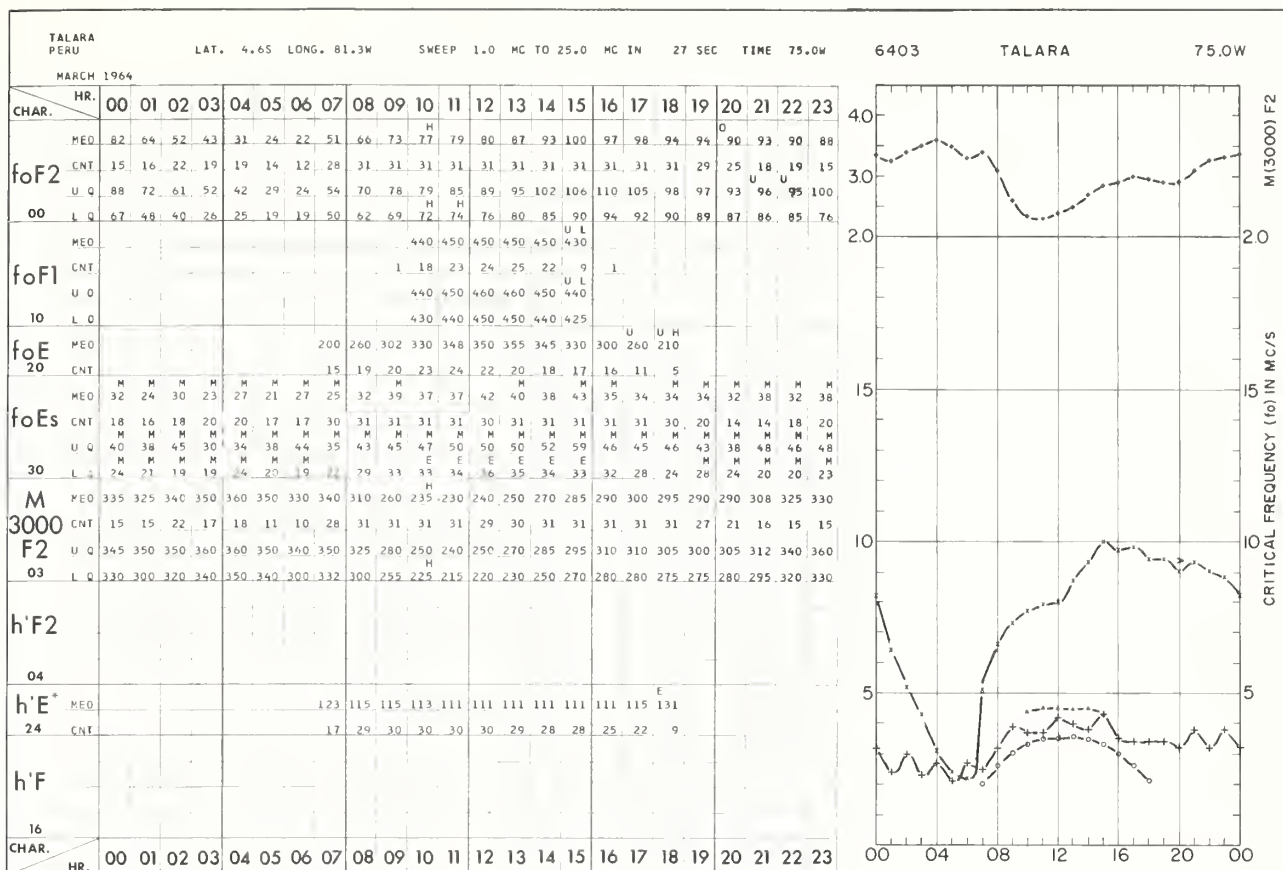


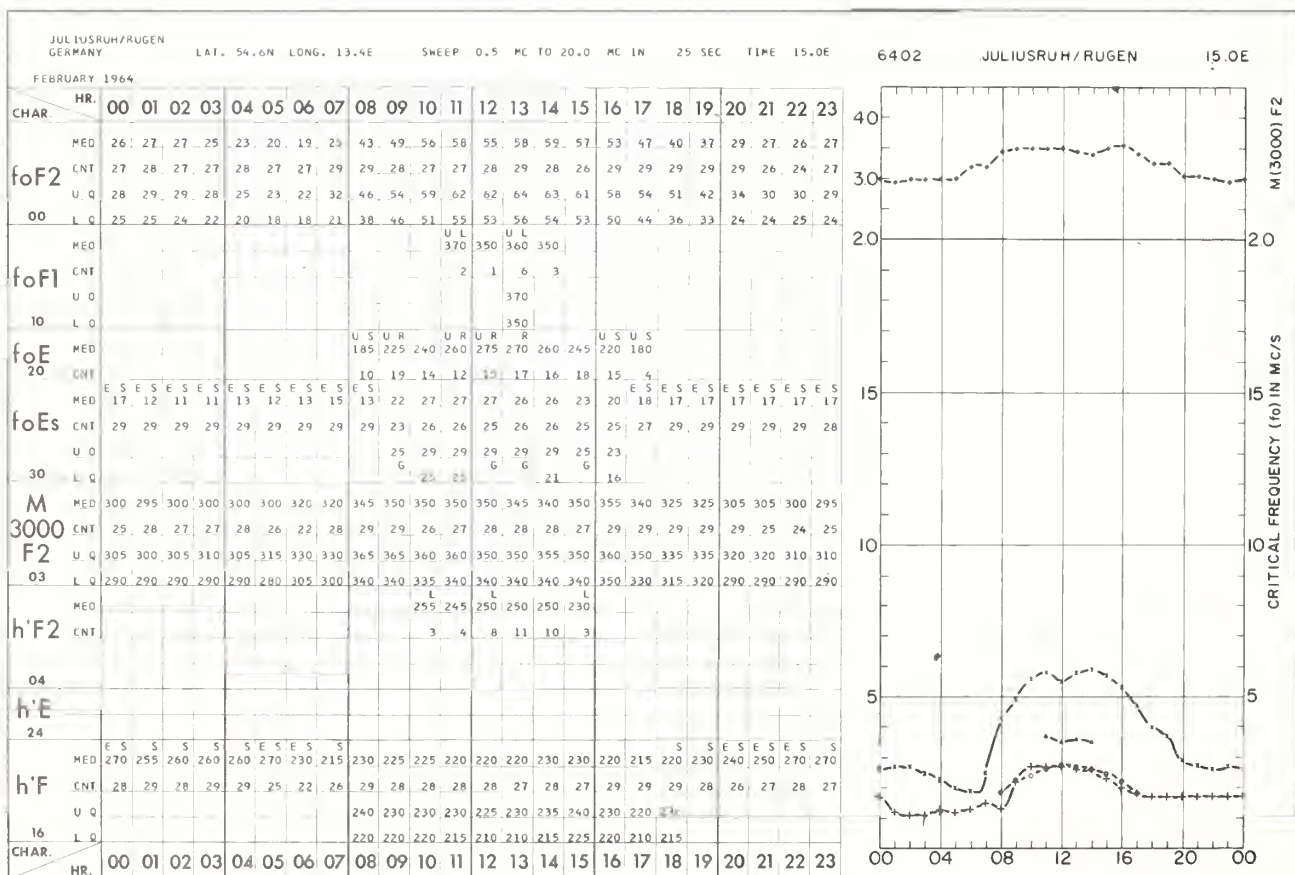
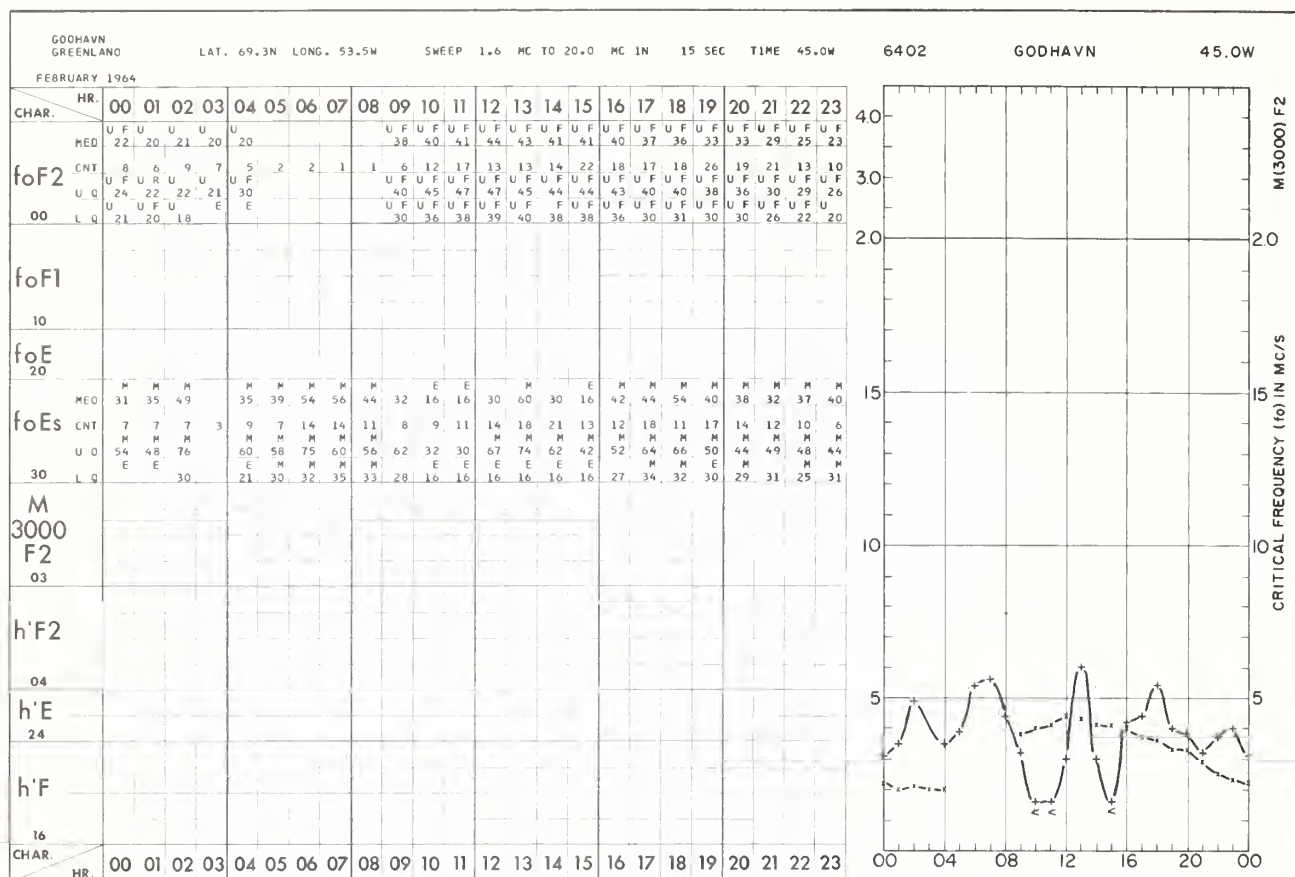


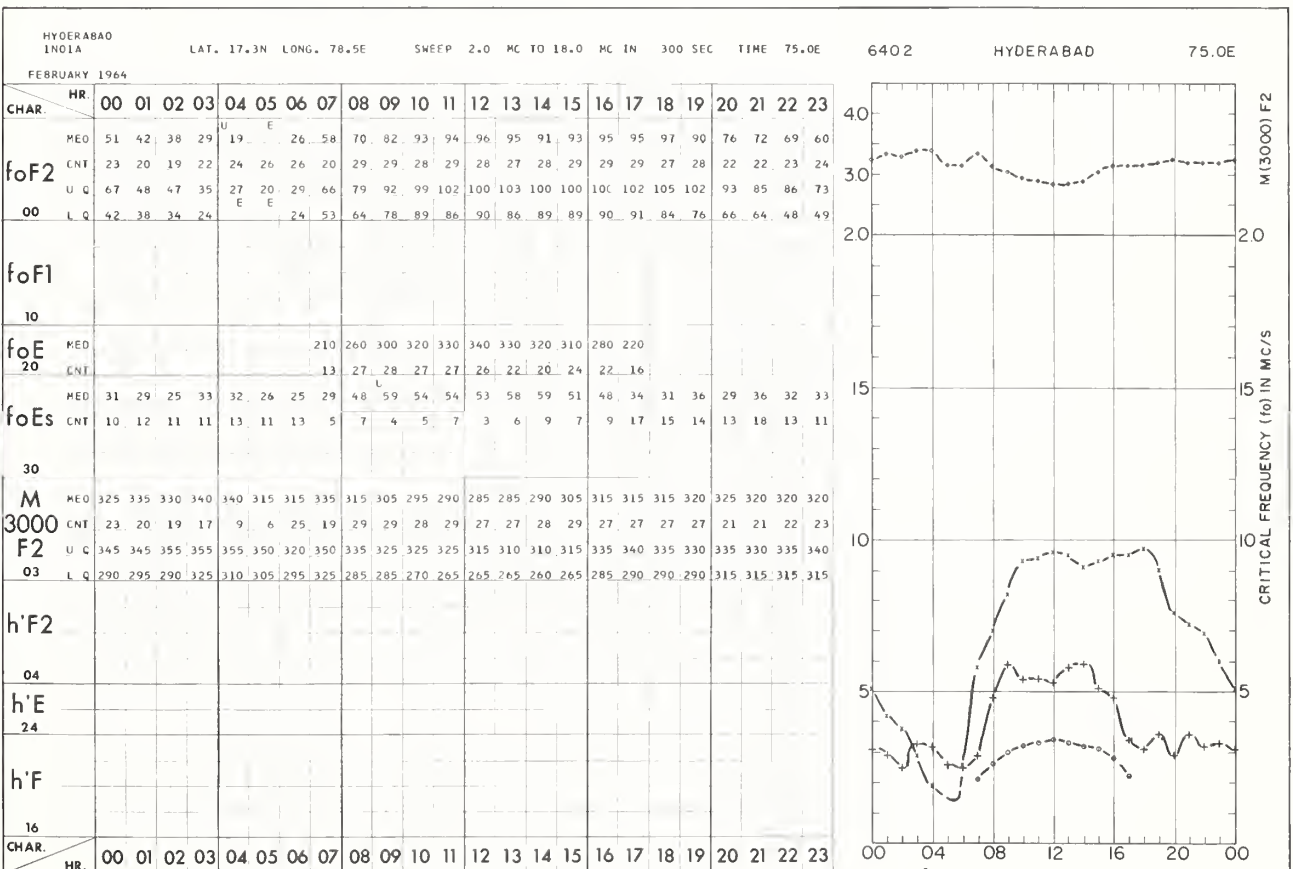
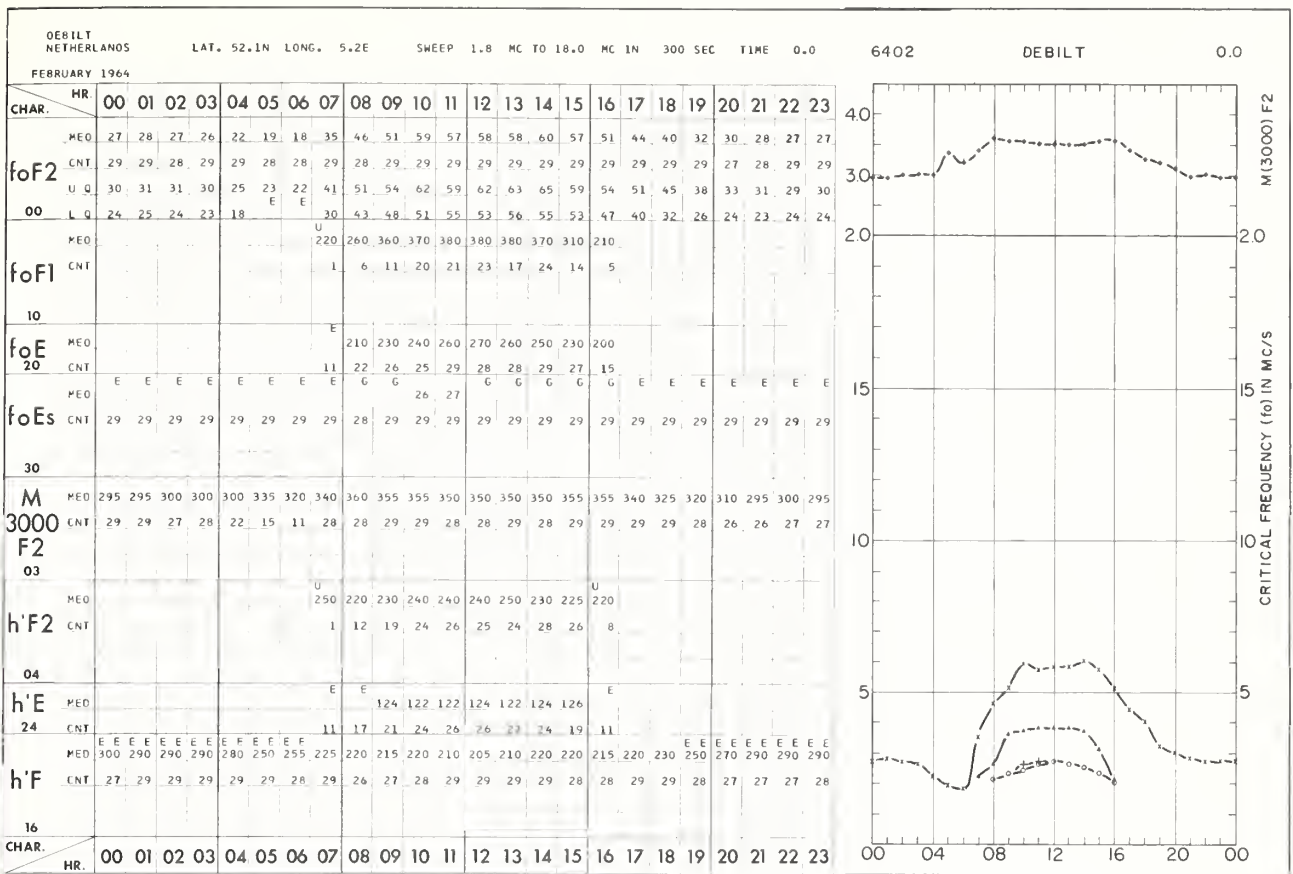


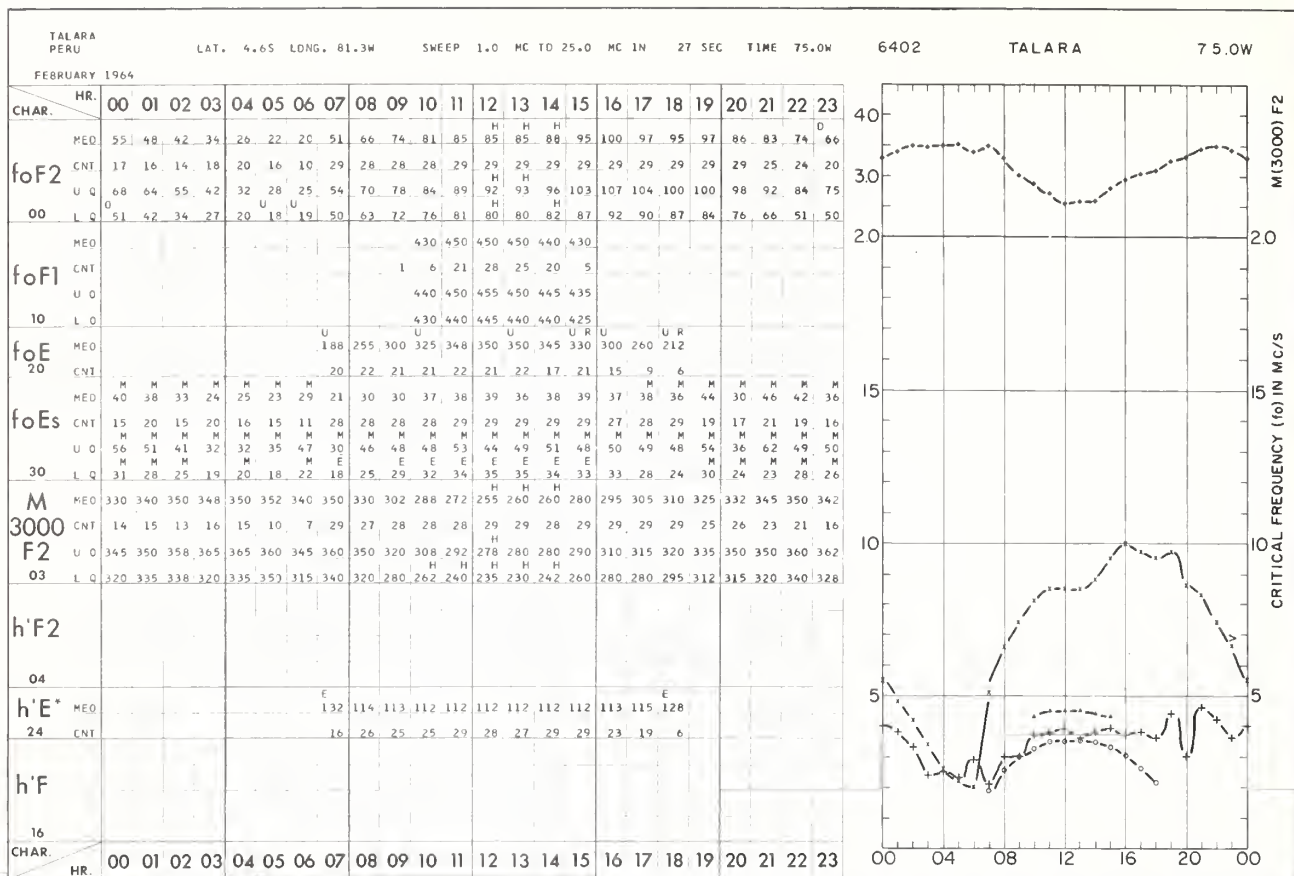




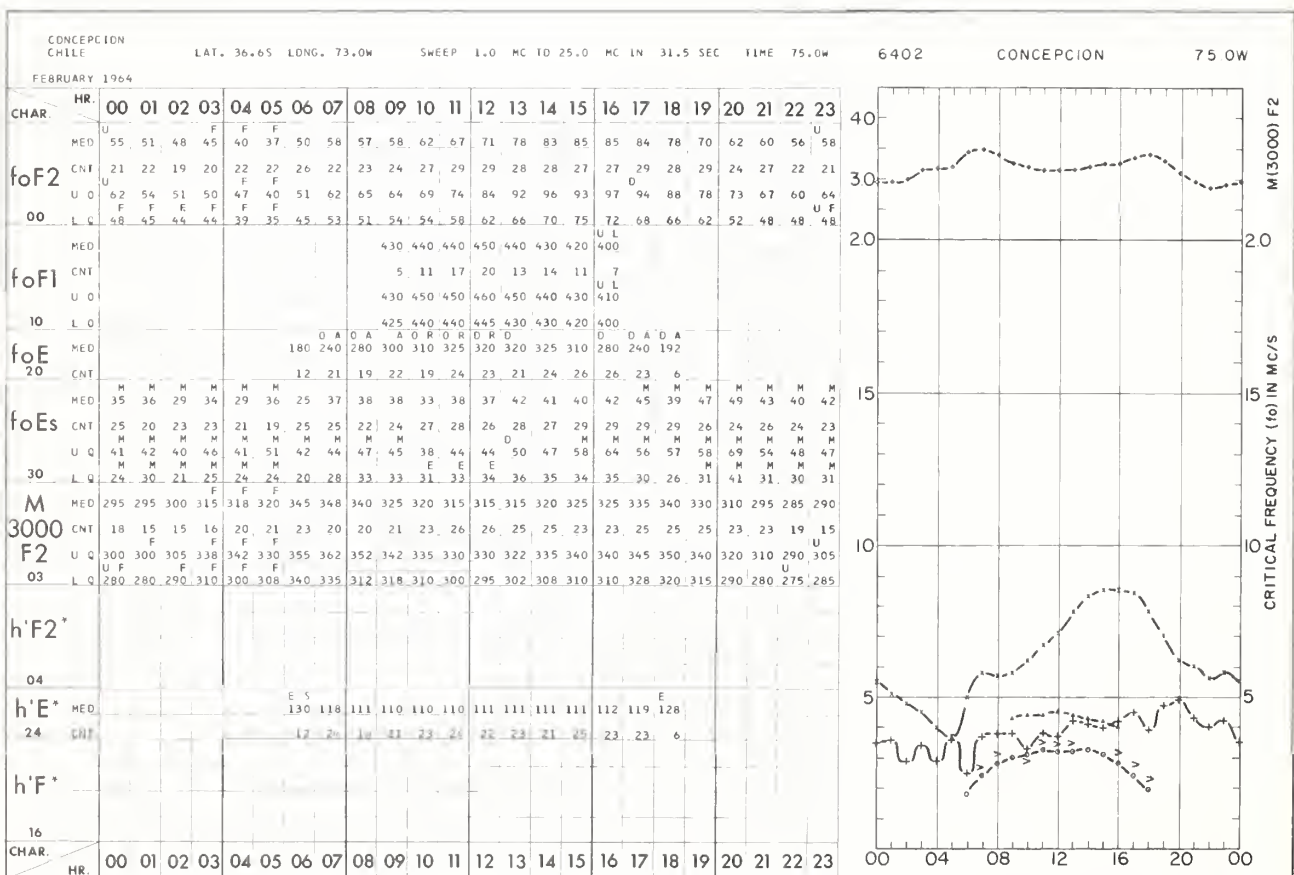




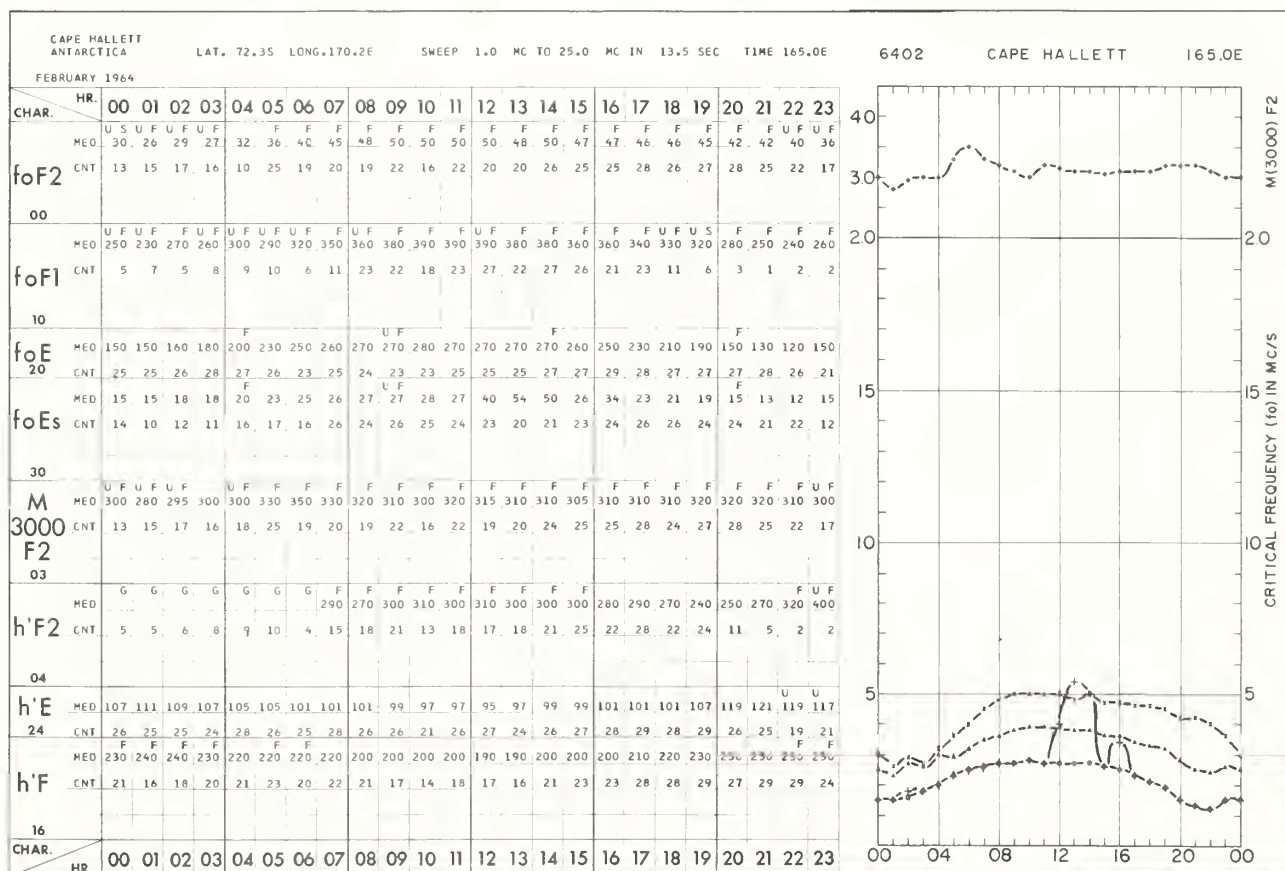
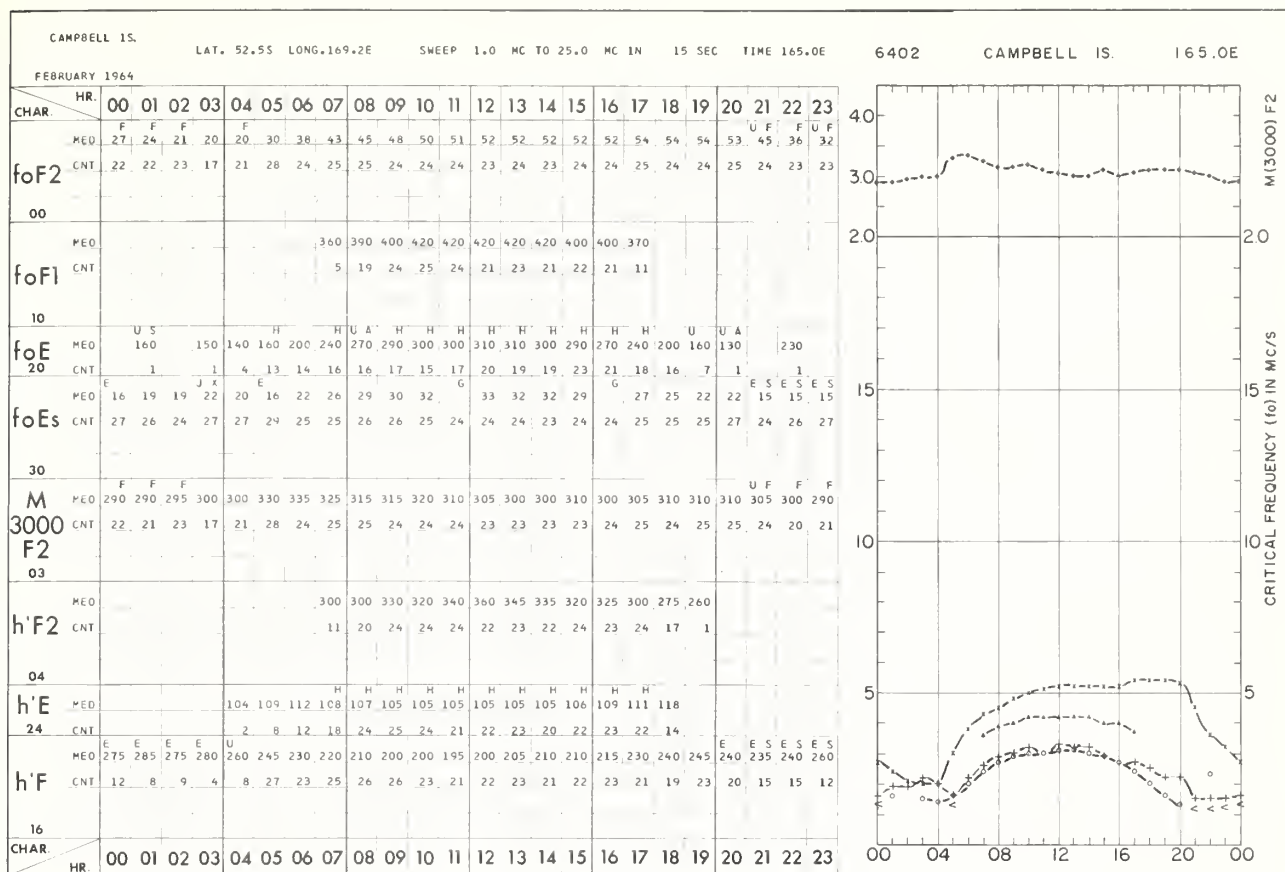


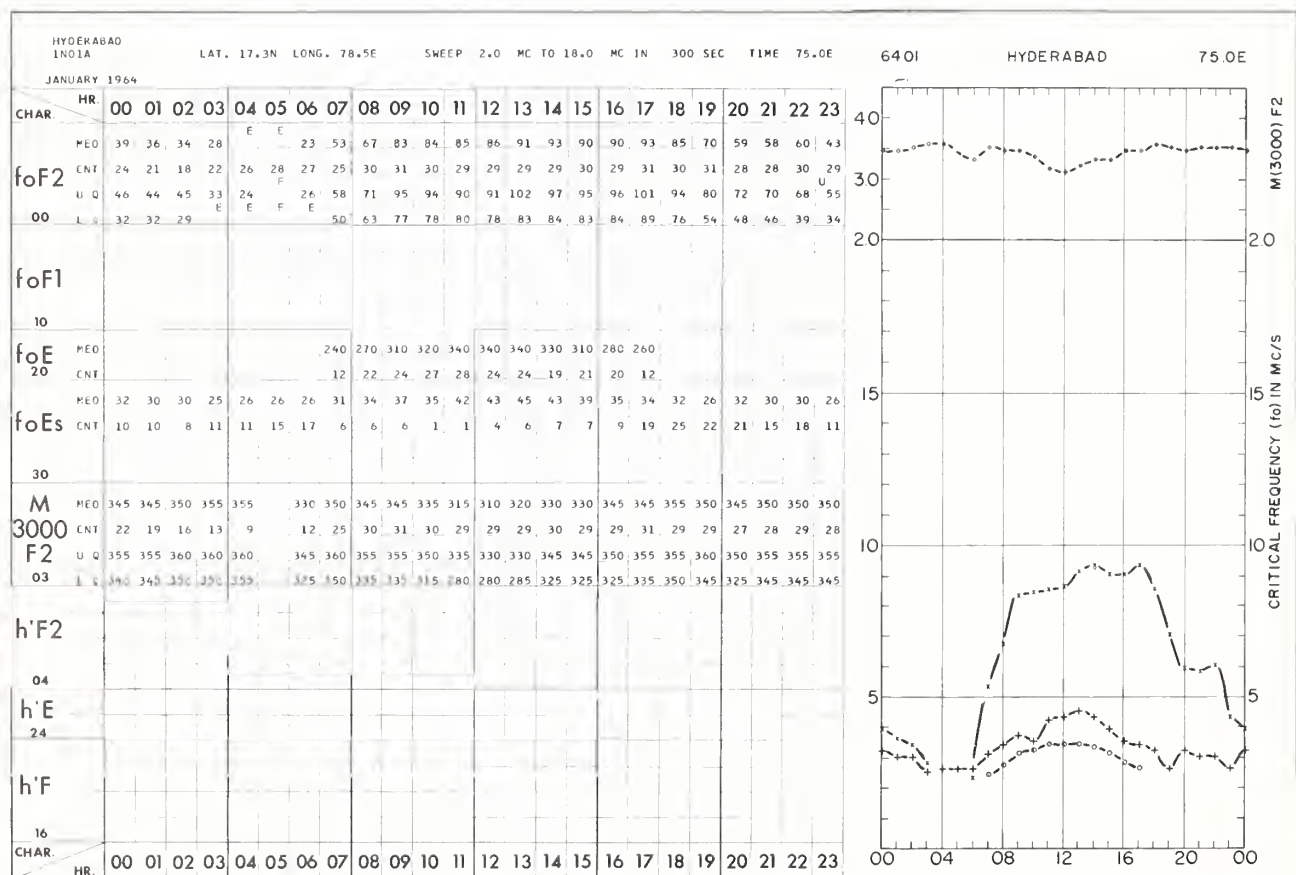
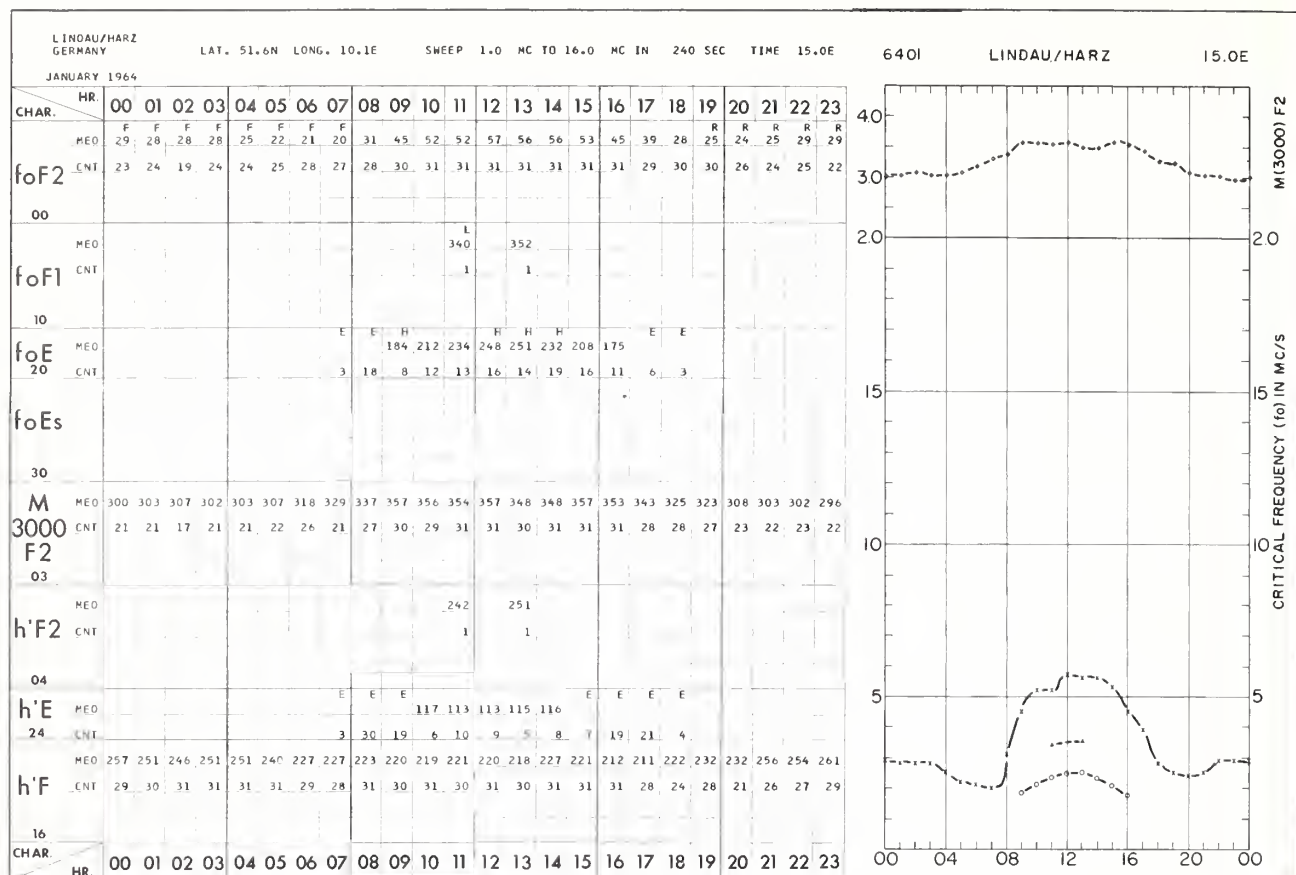


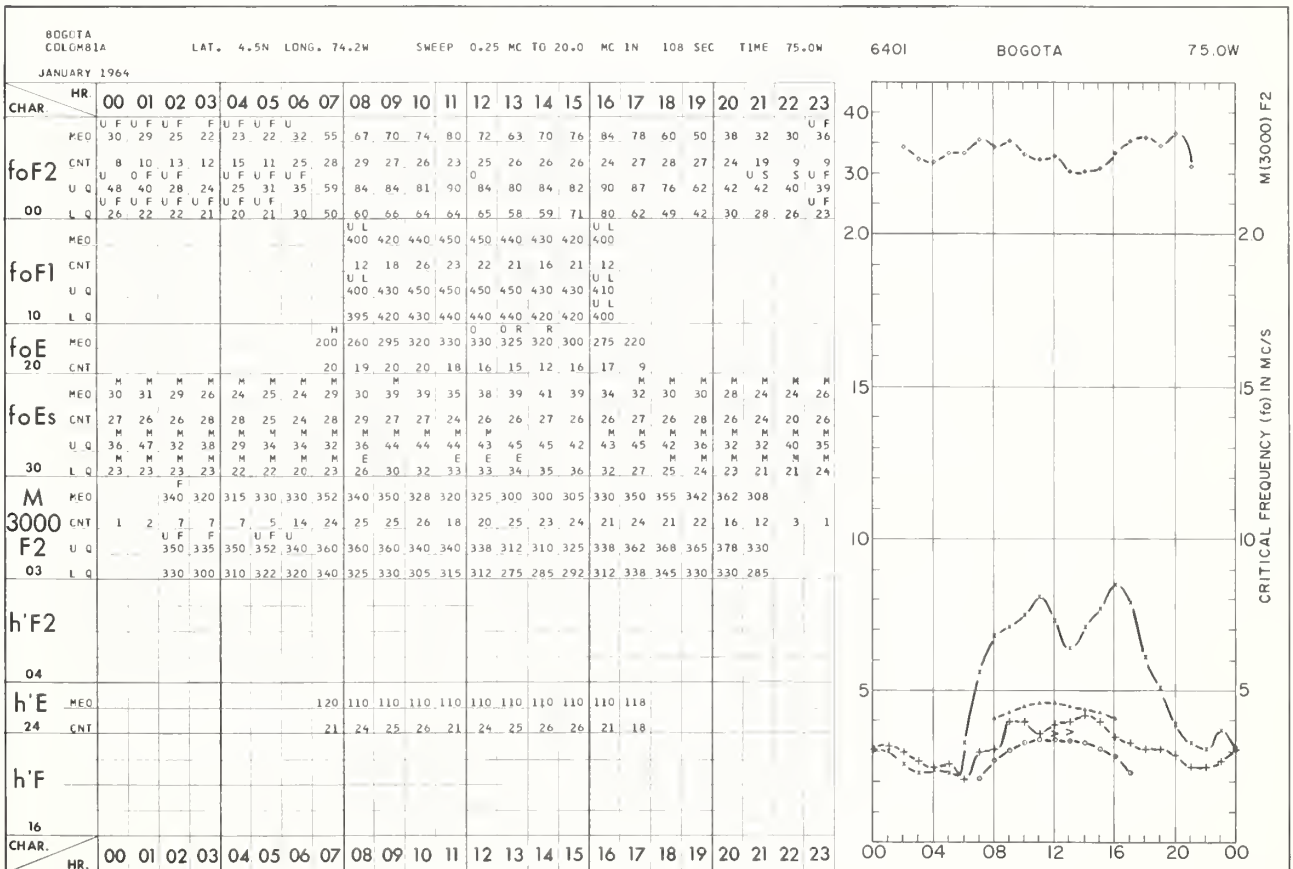
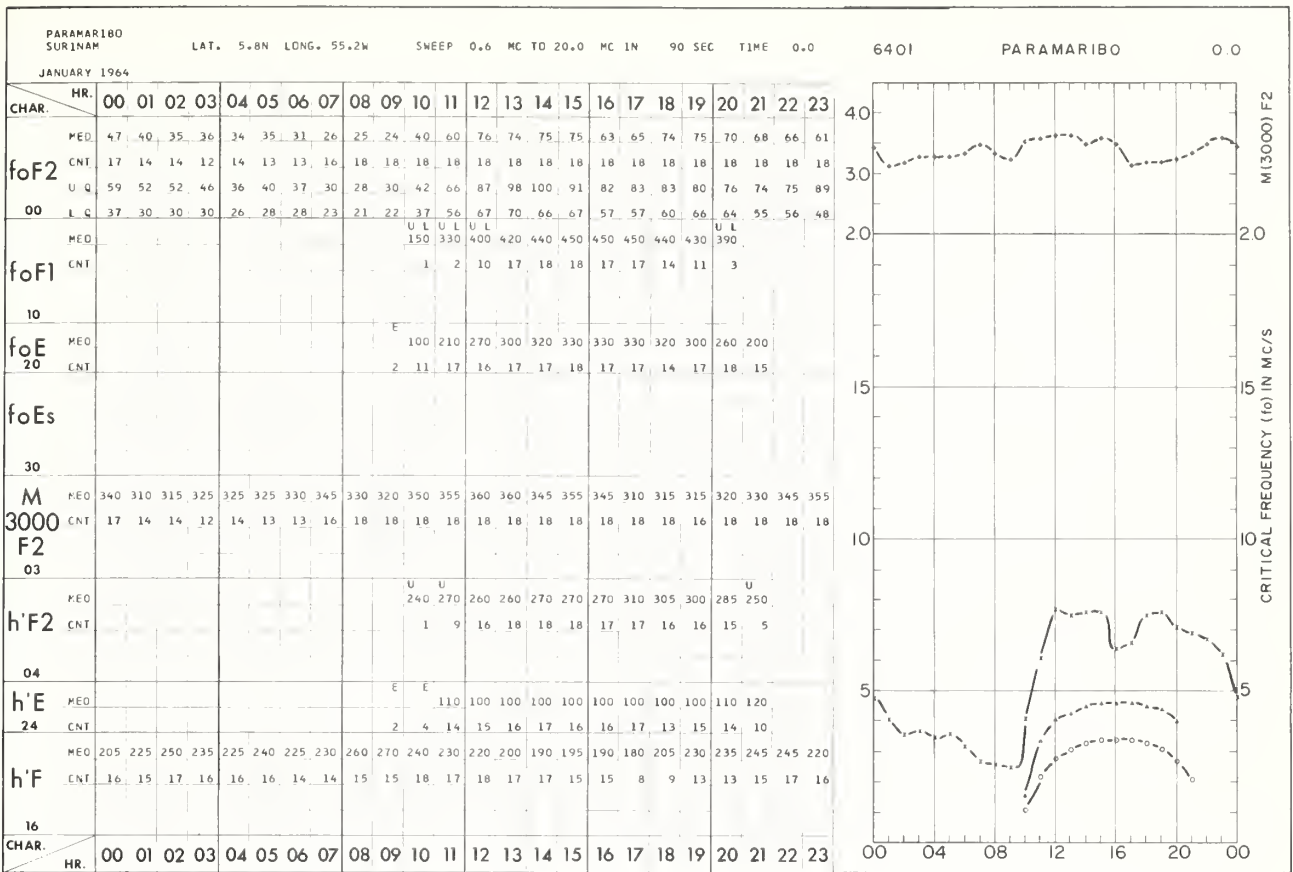
*Values of h'F2 are often incorrect owing to the fact that the trace has not always become horizontal.

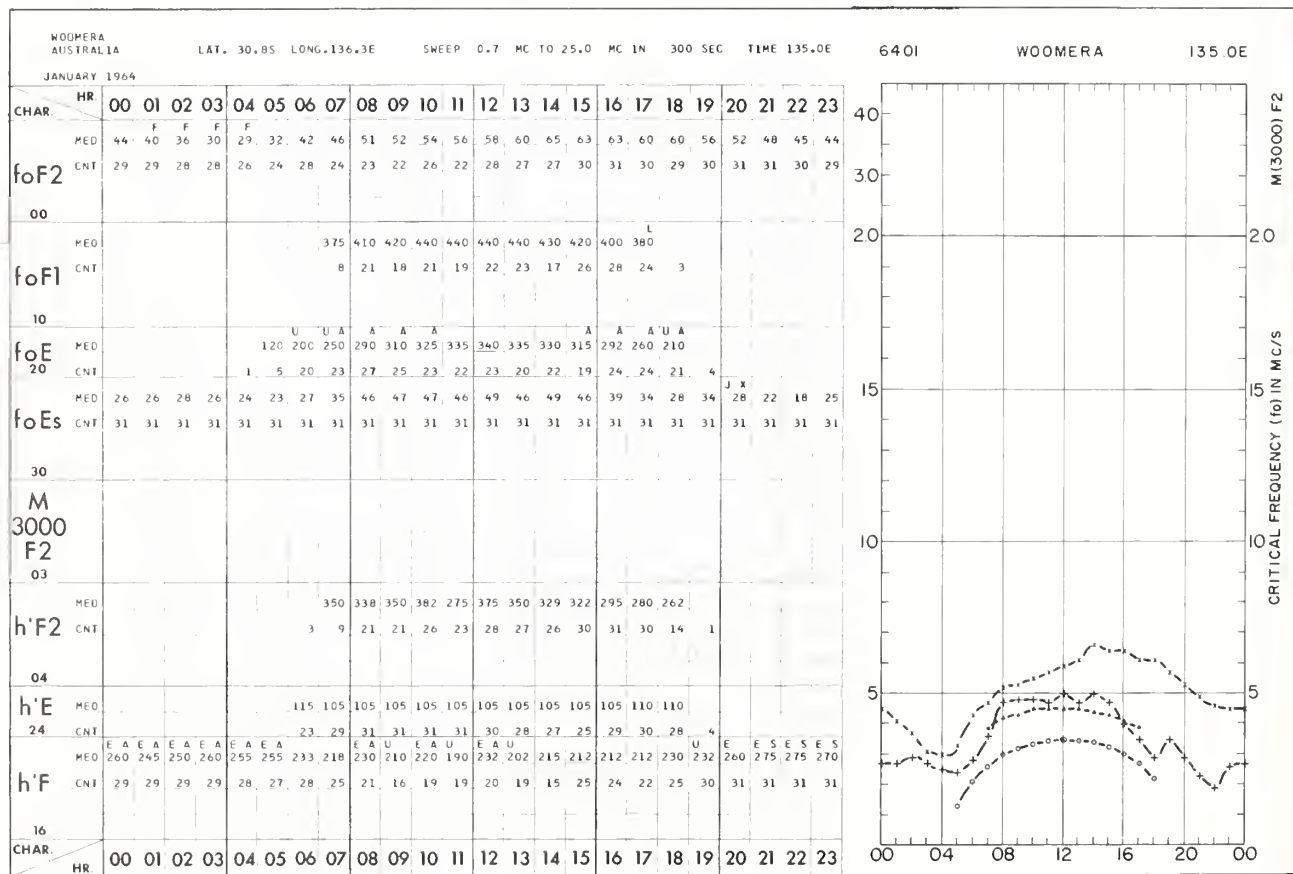
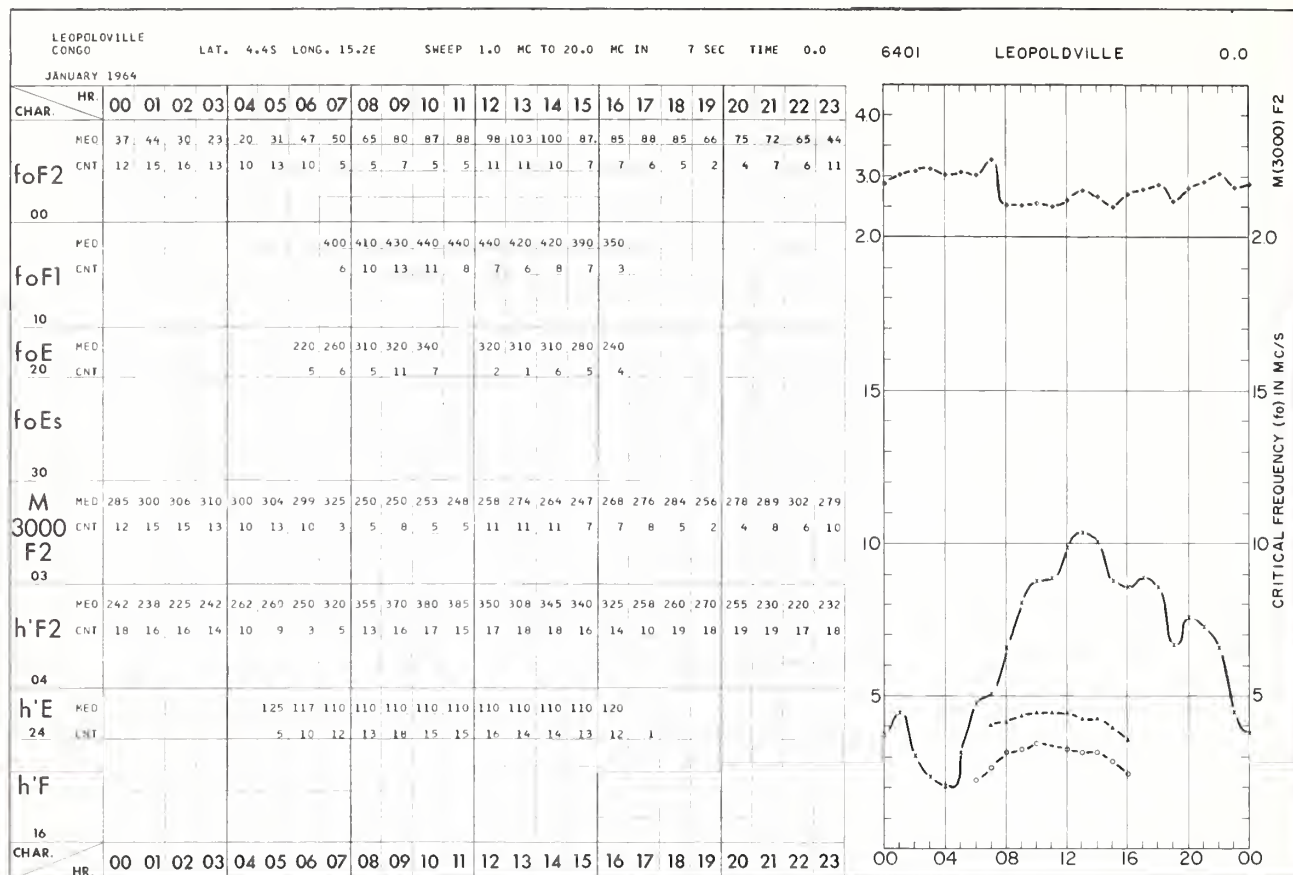


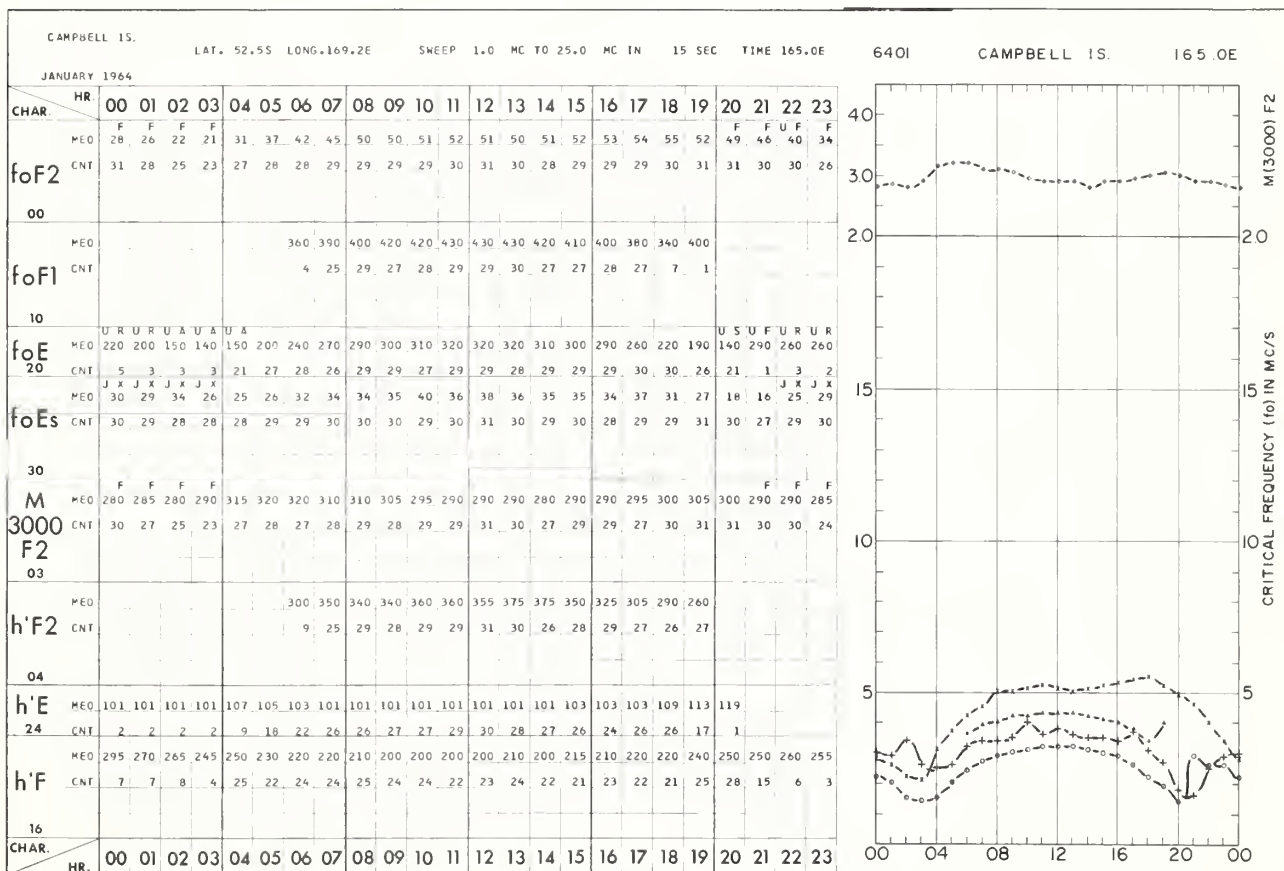
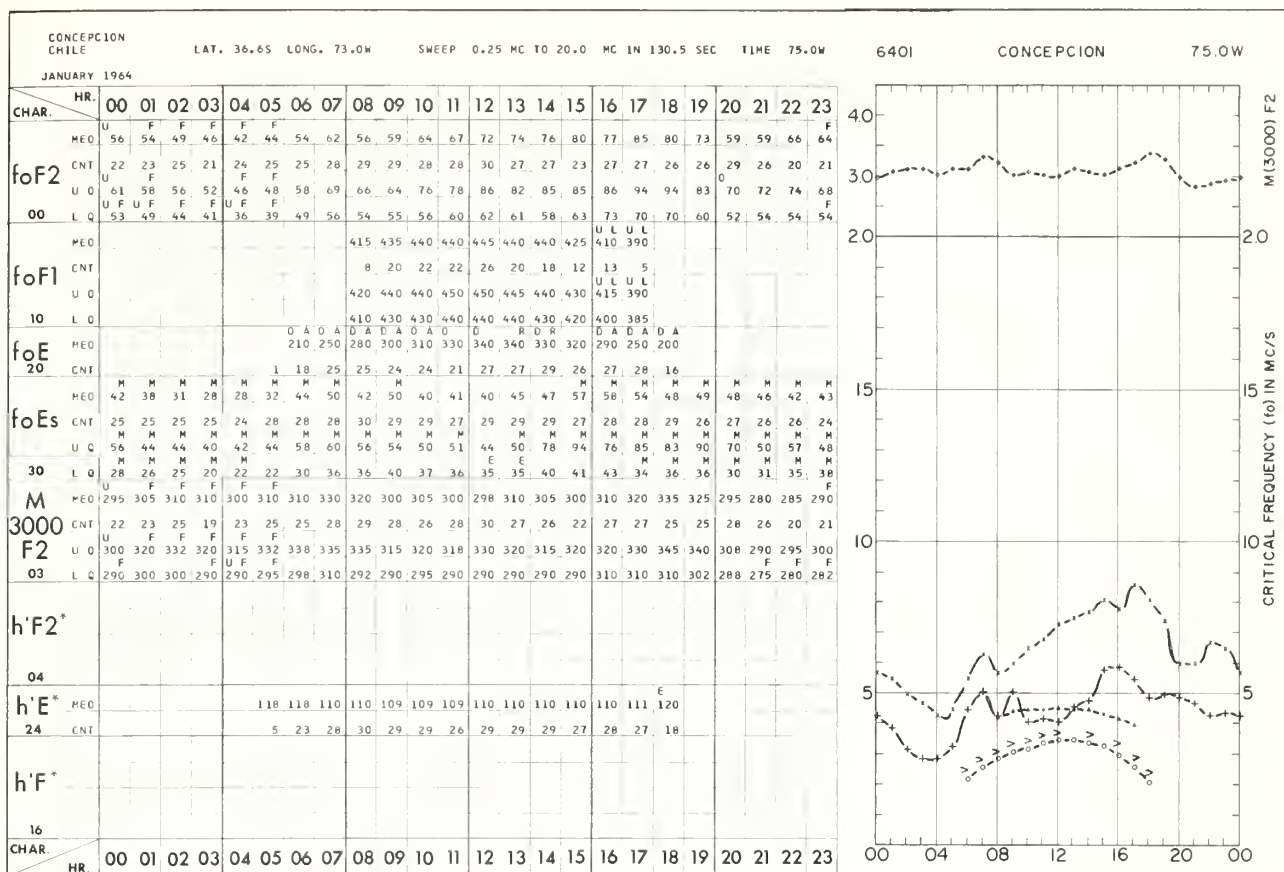
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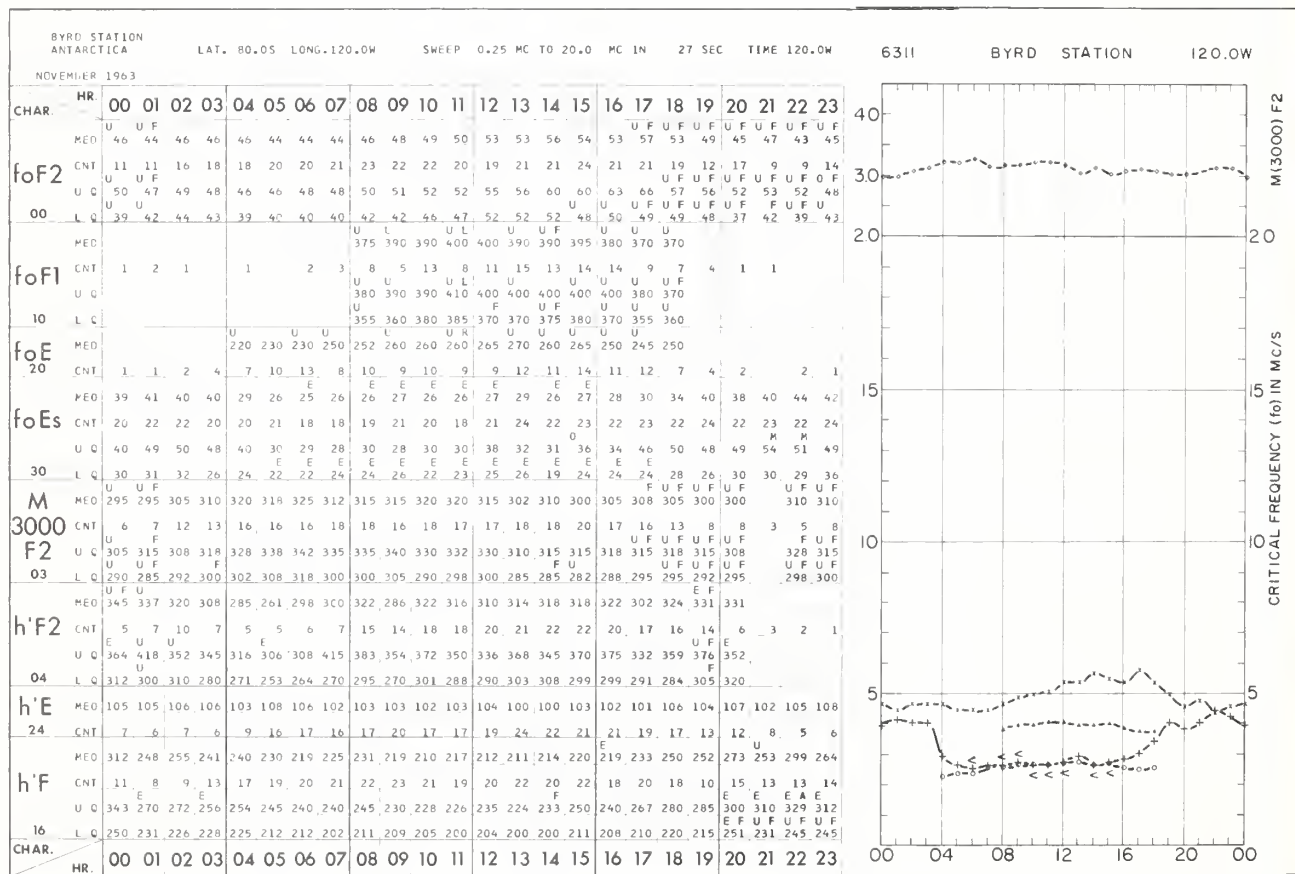
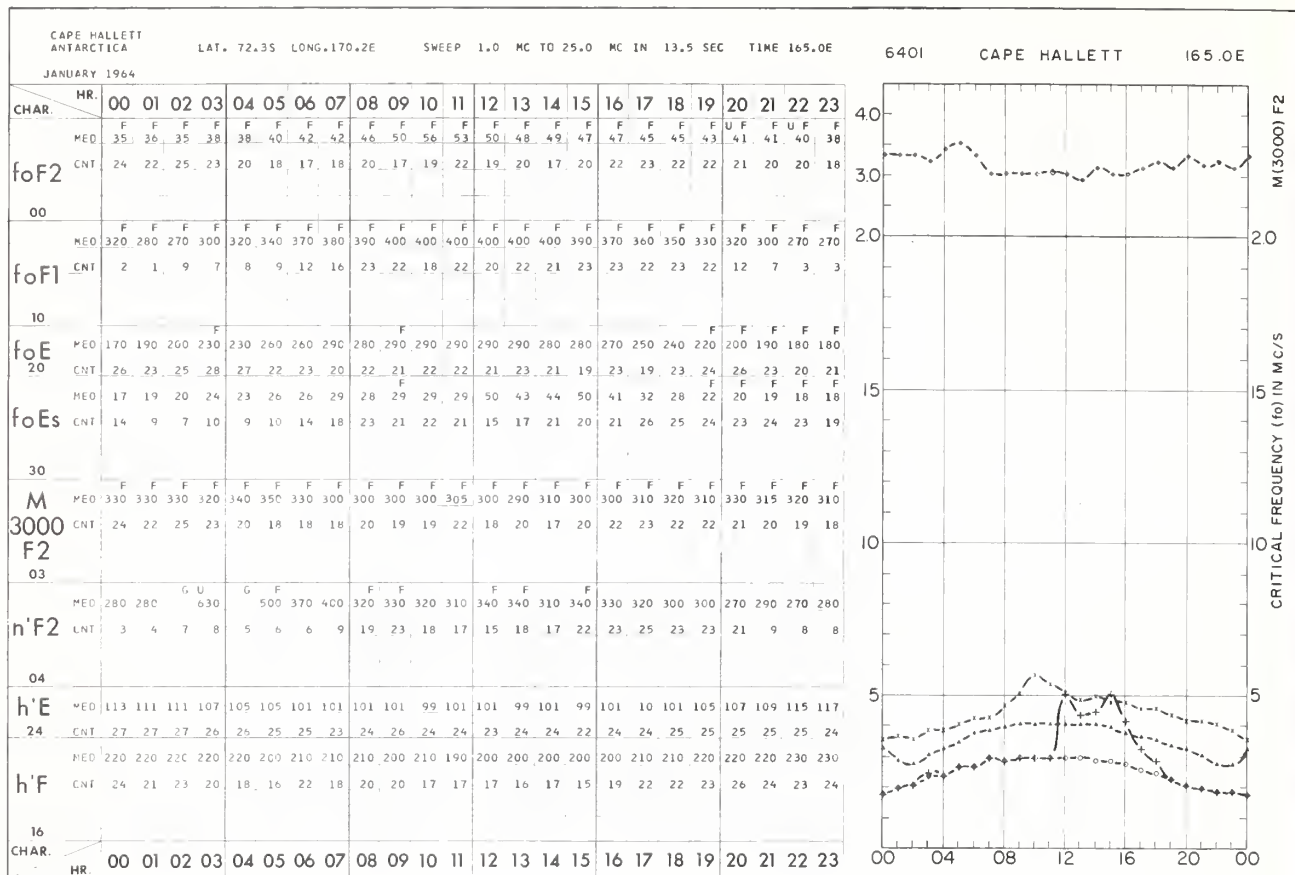


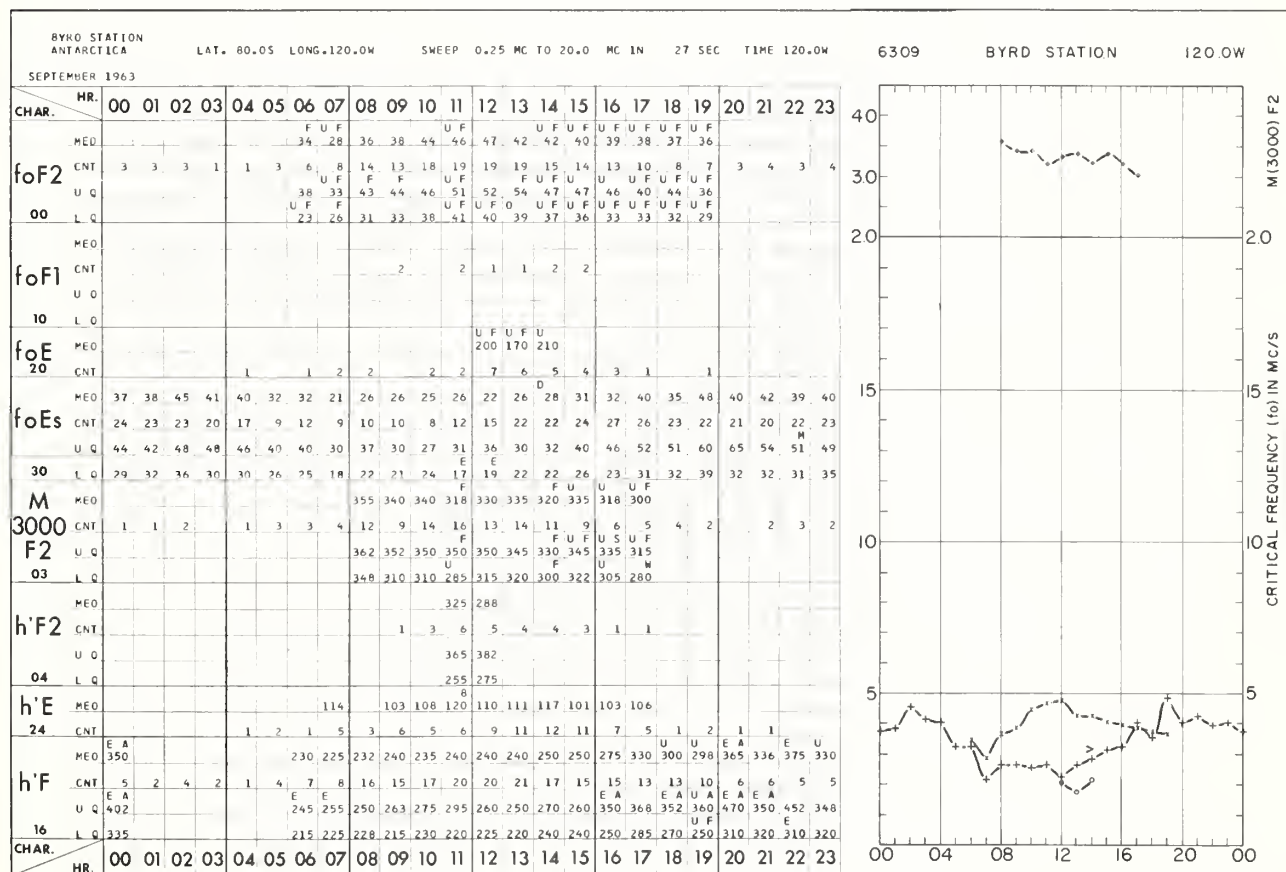
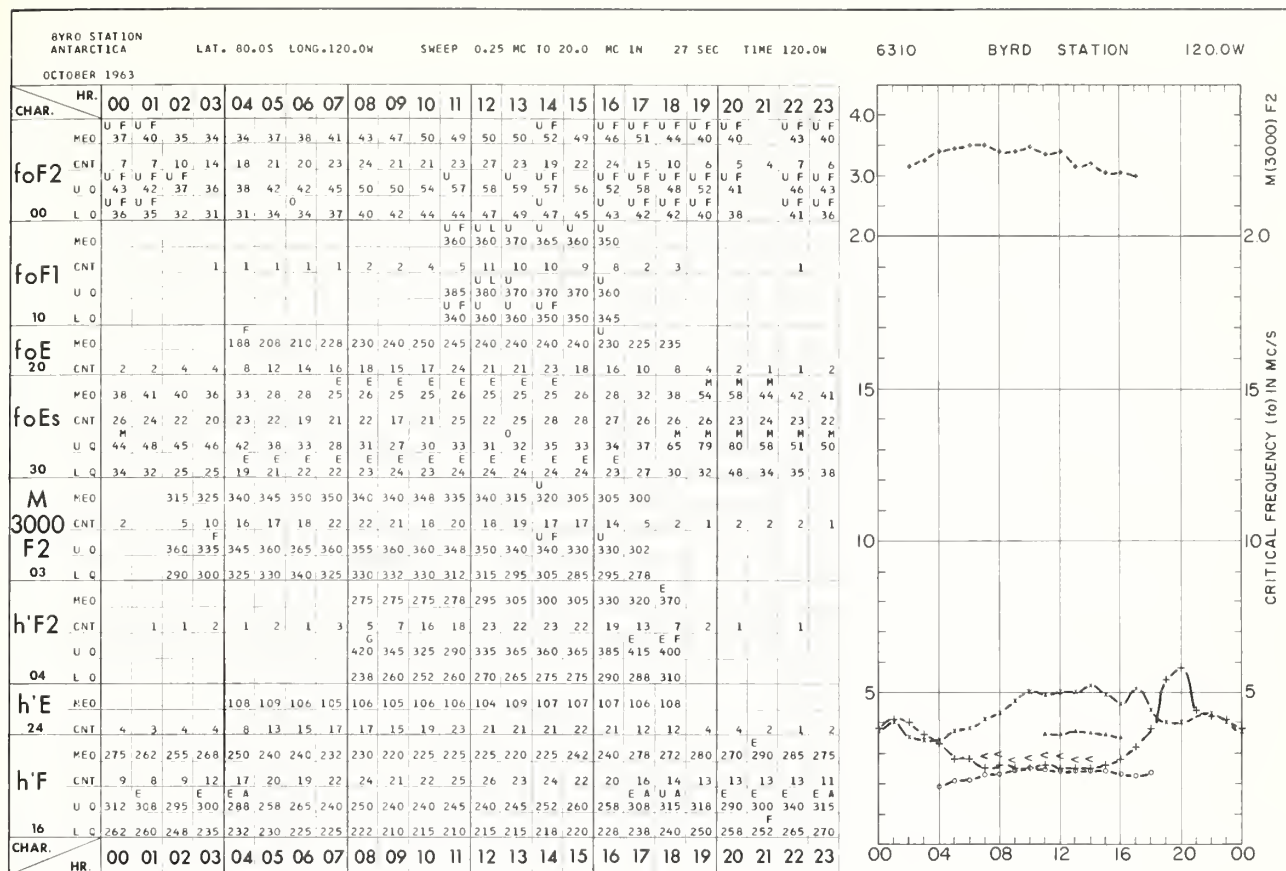


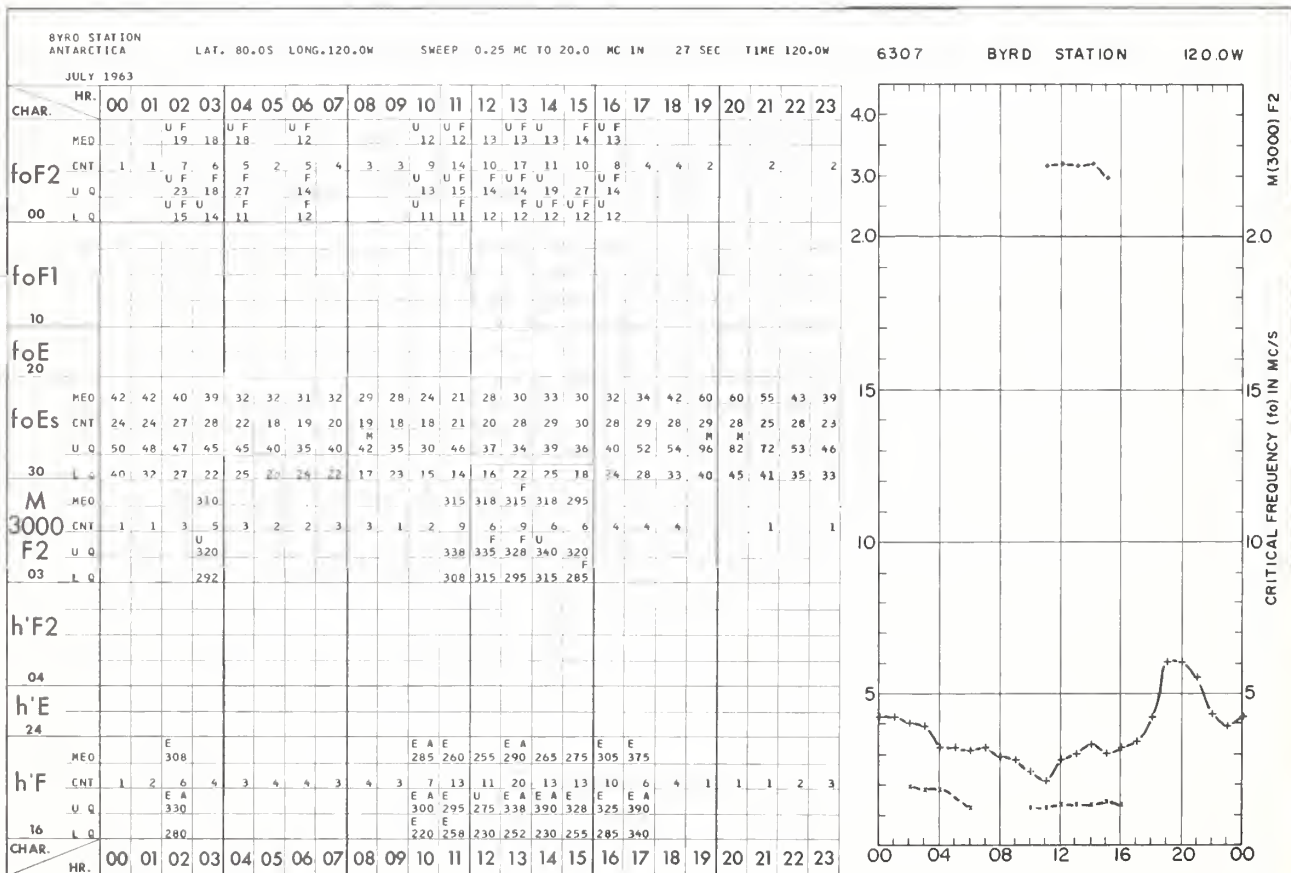
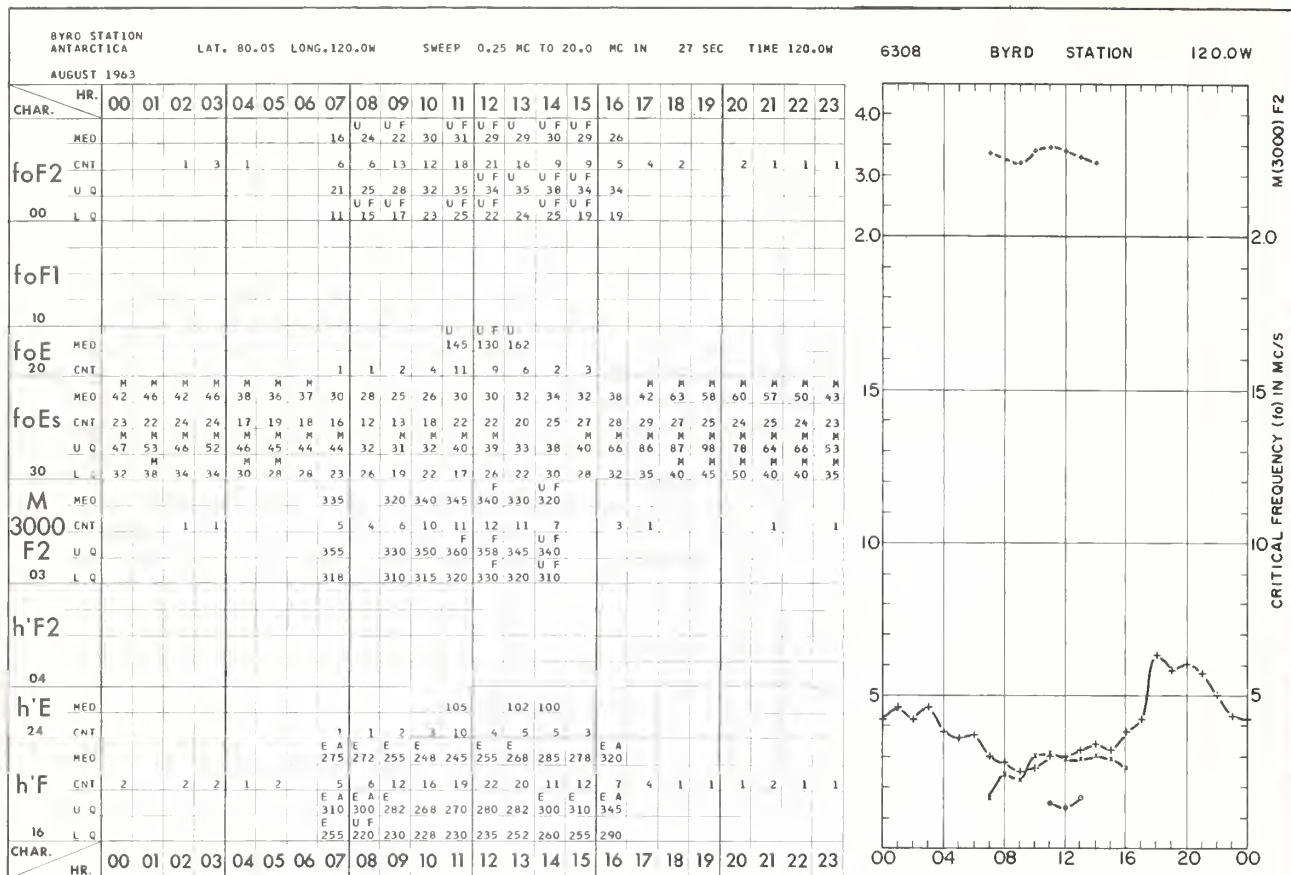


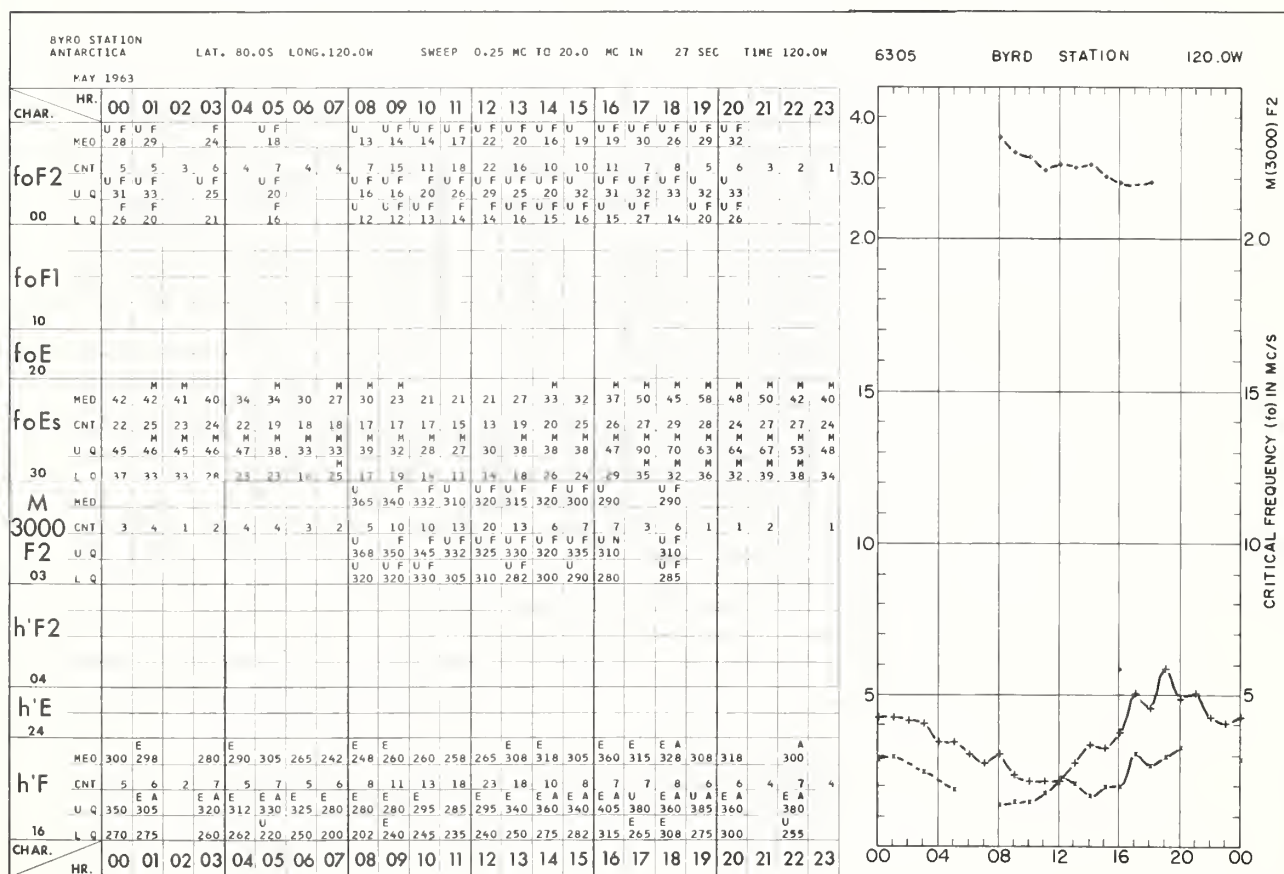
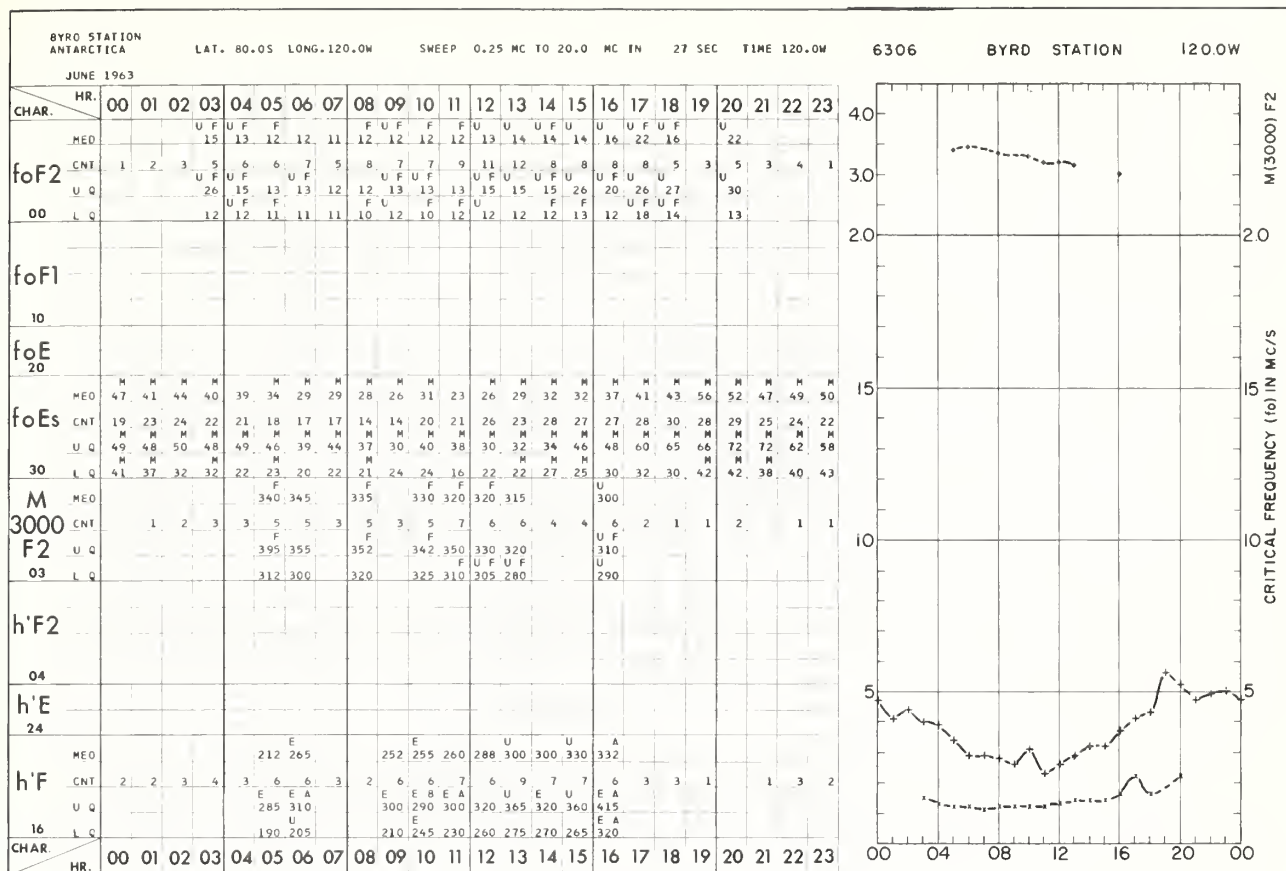


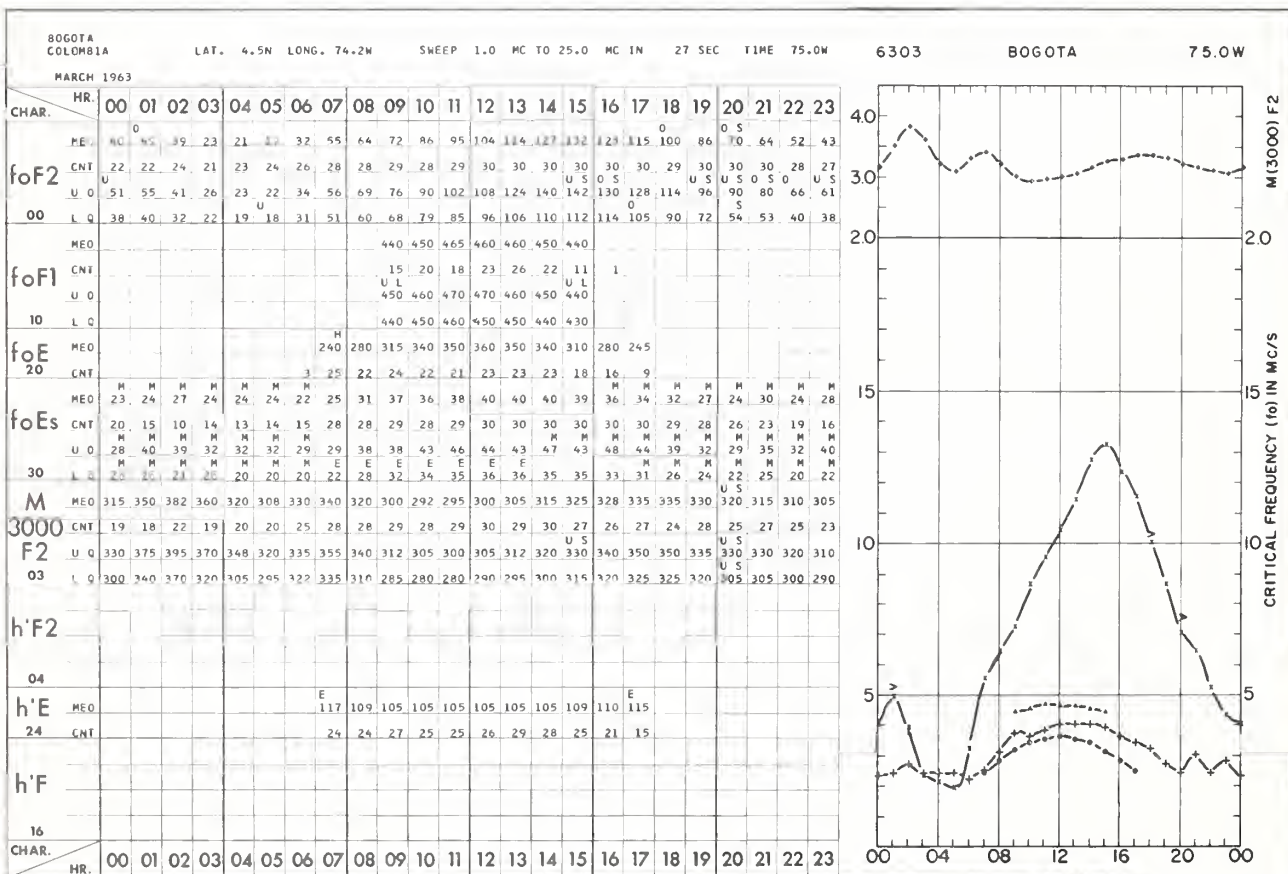
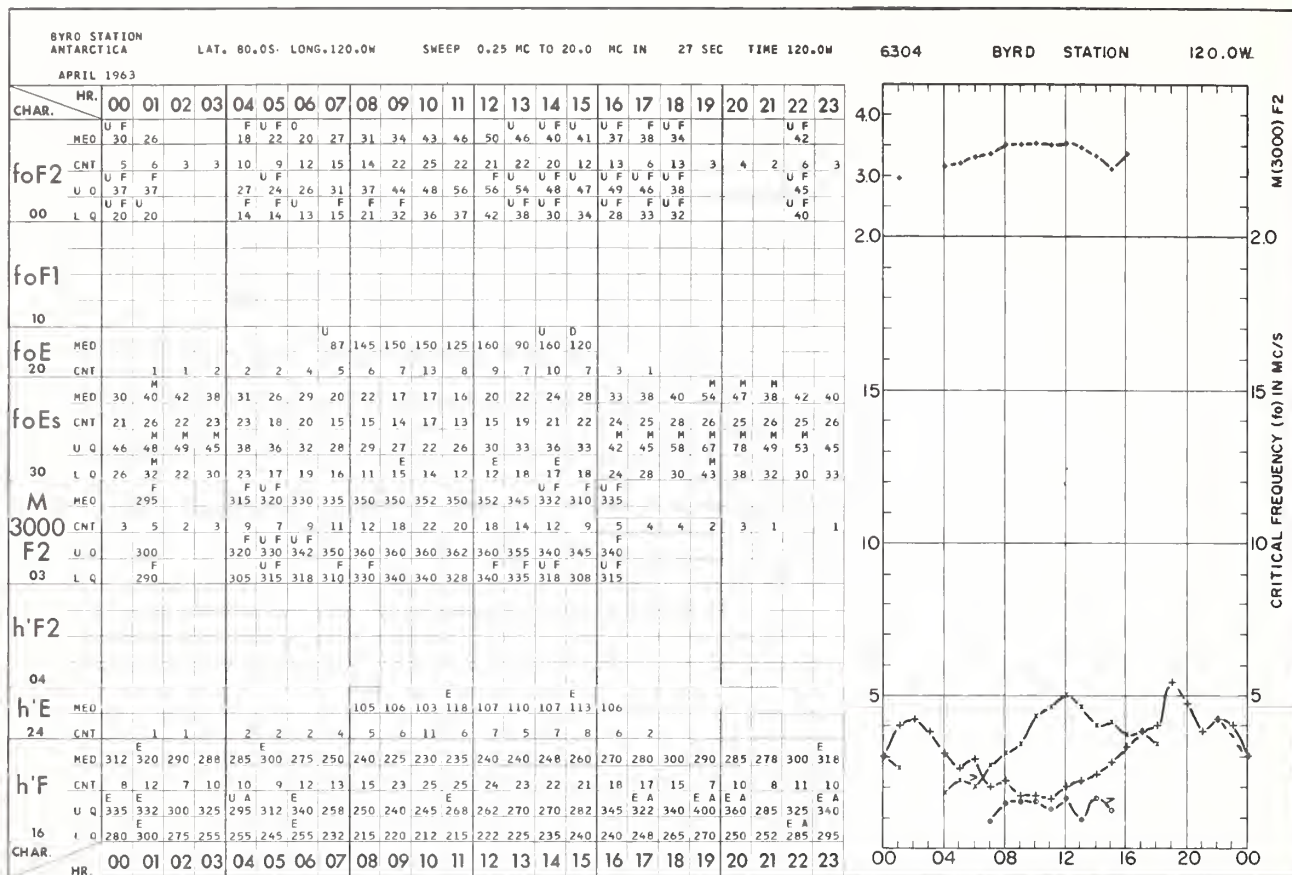


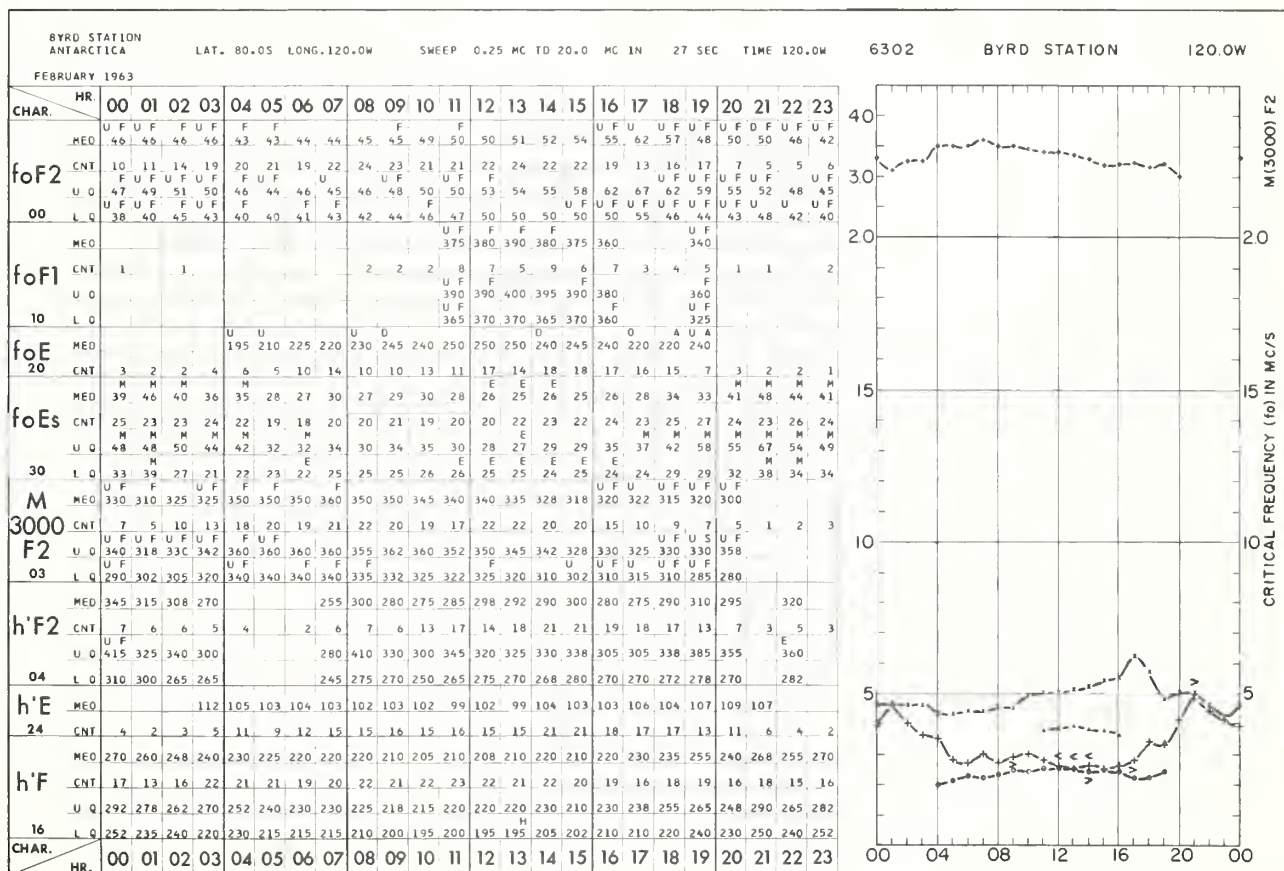
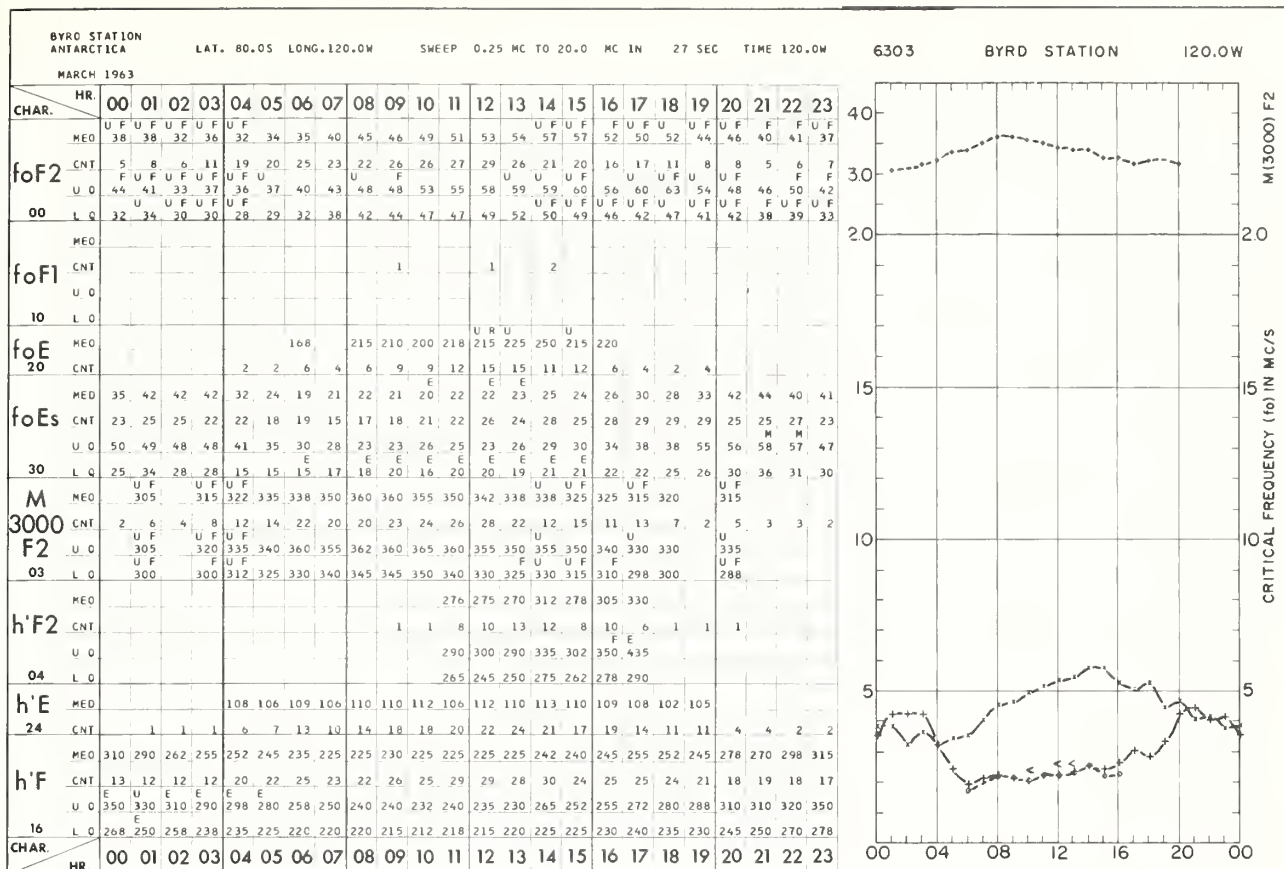


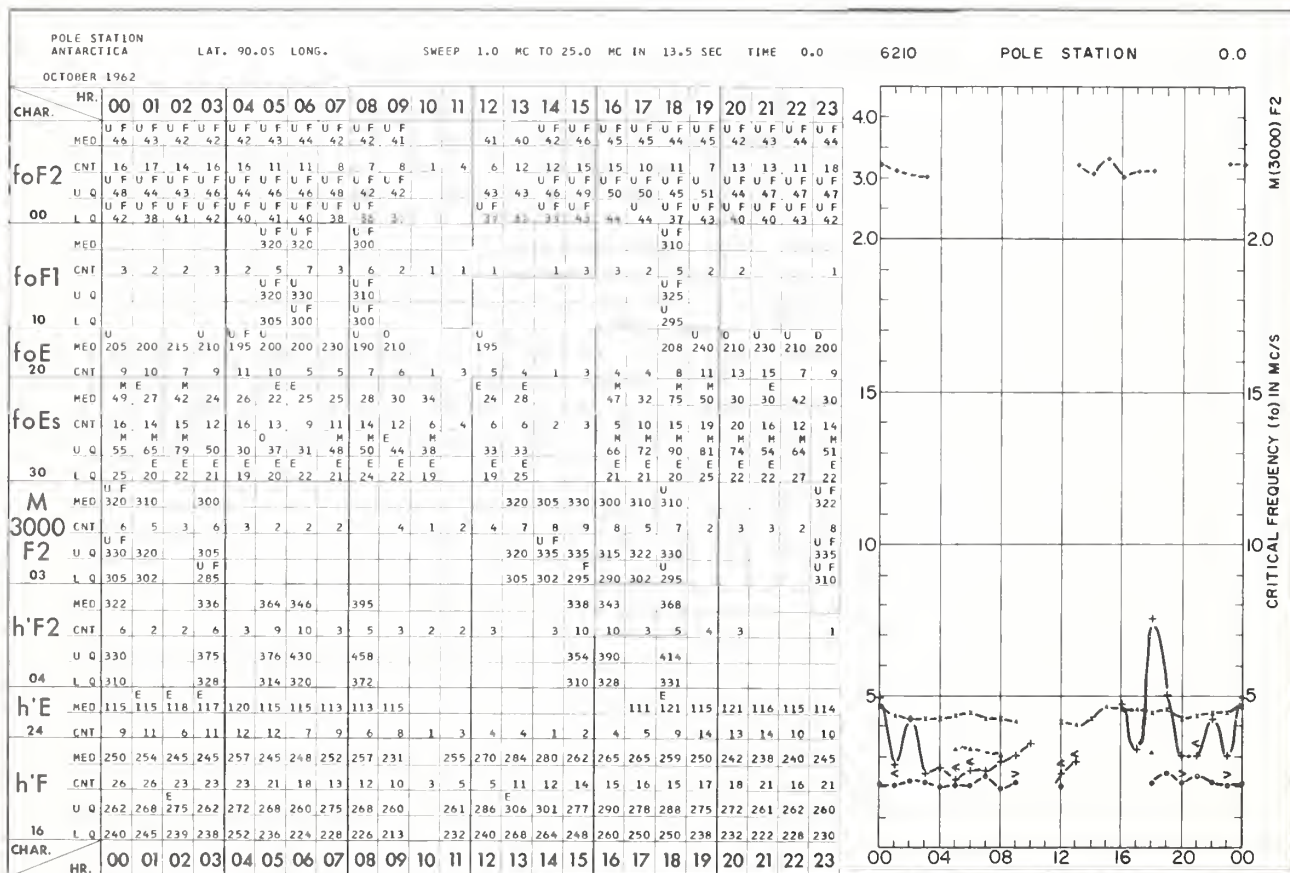
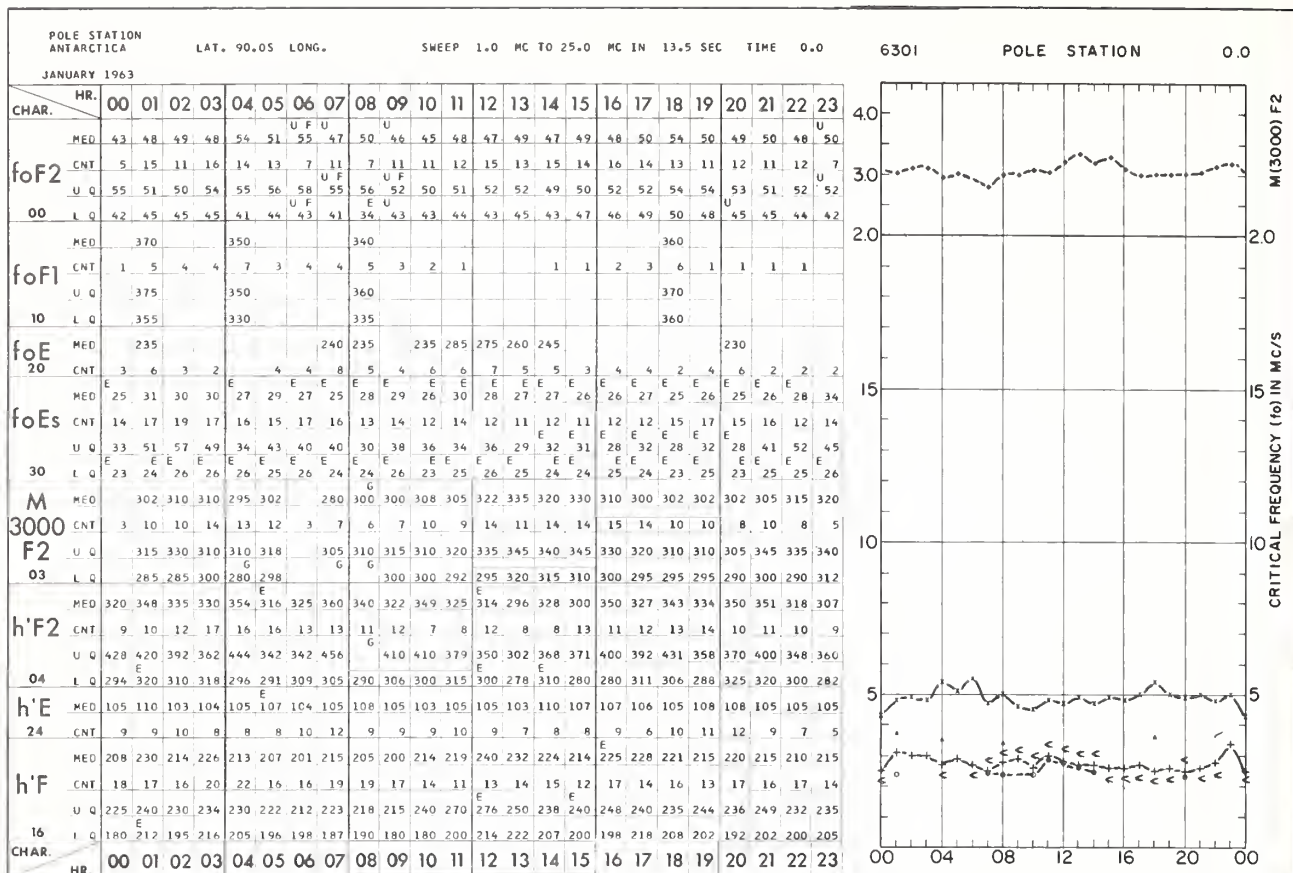


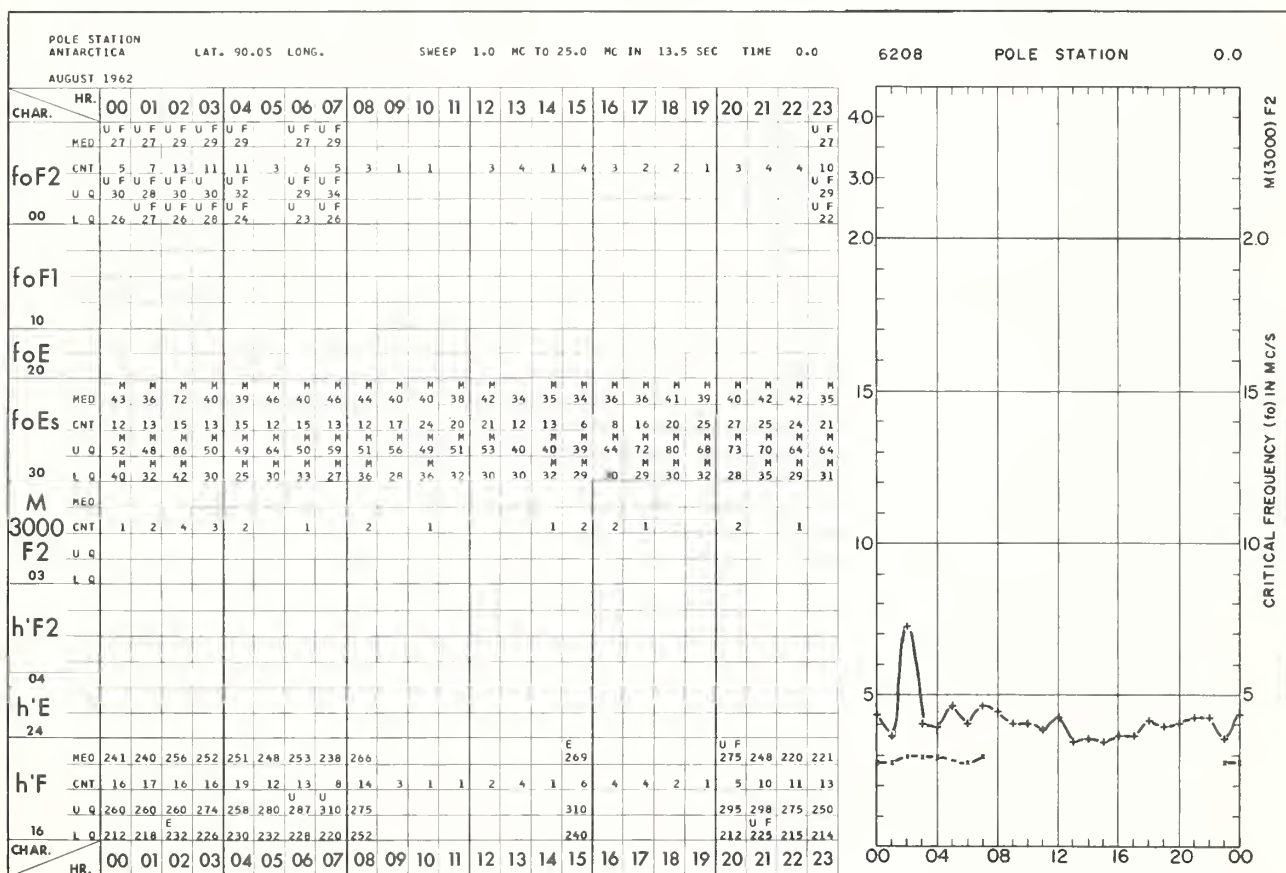
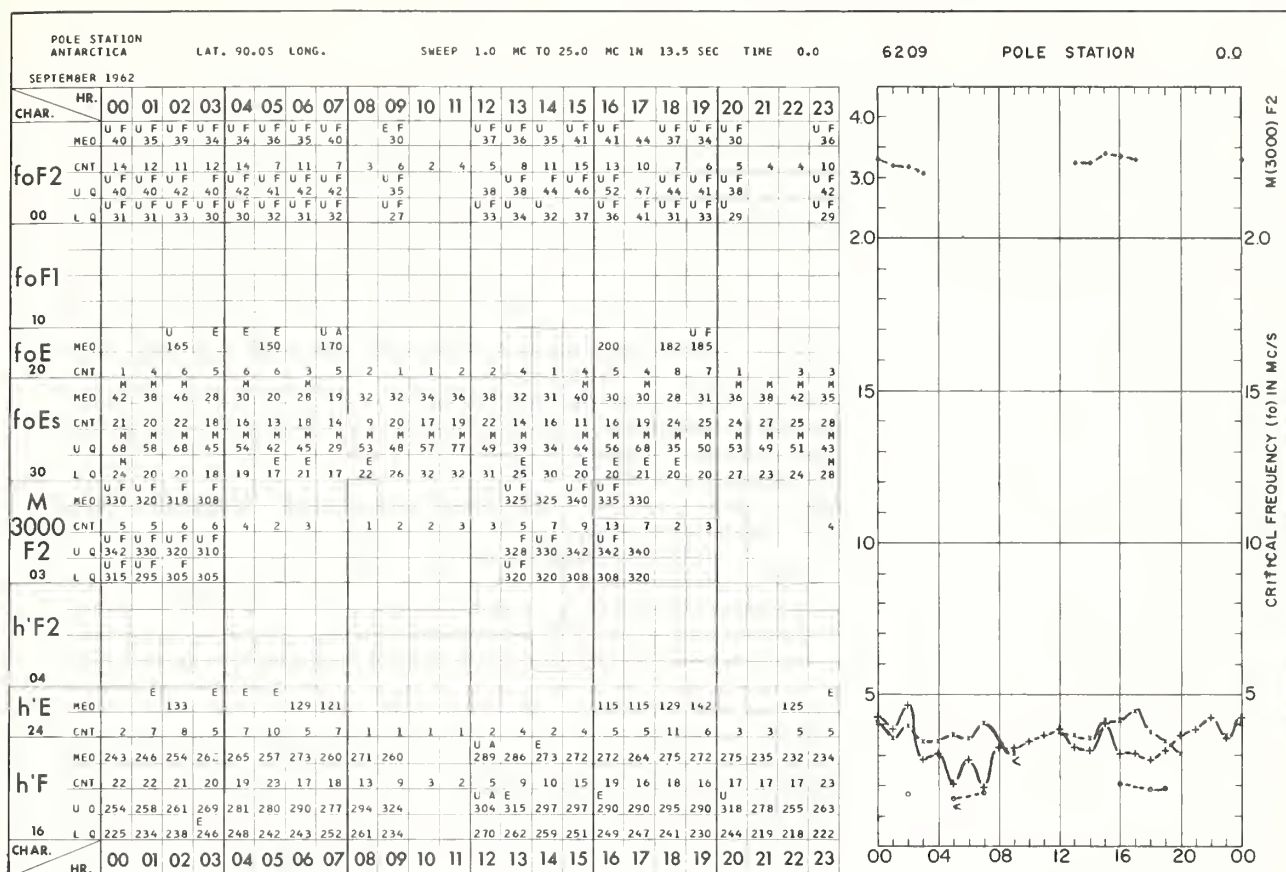


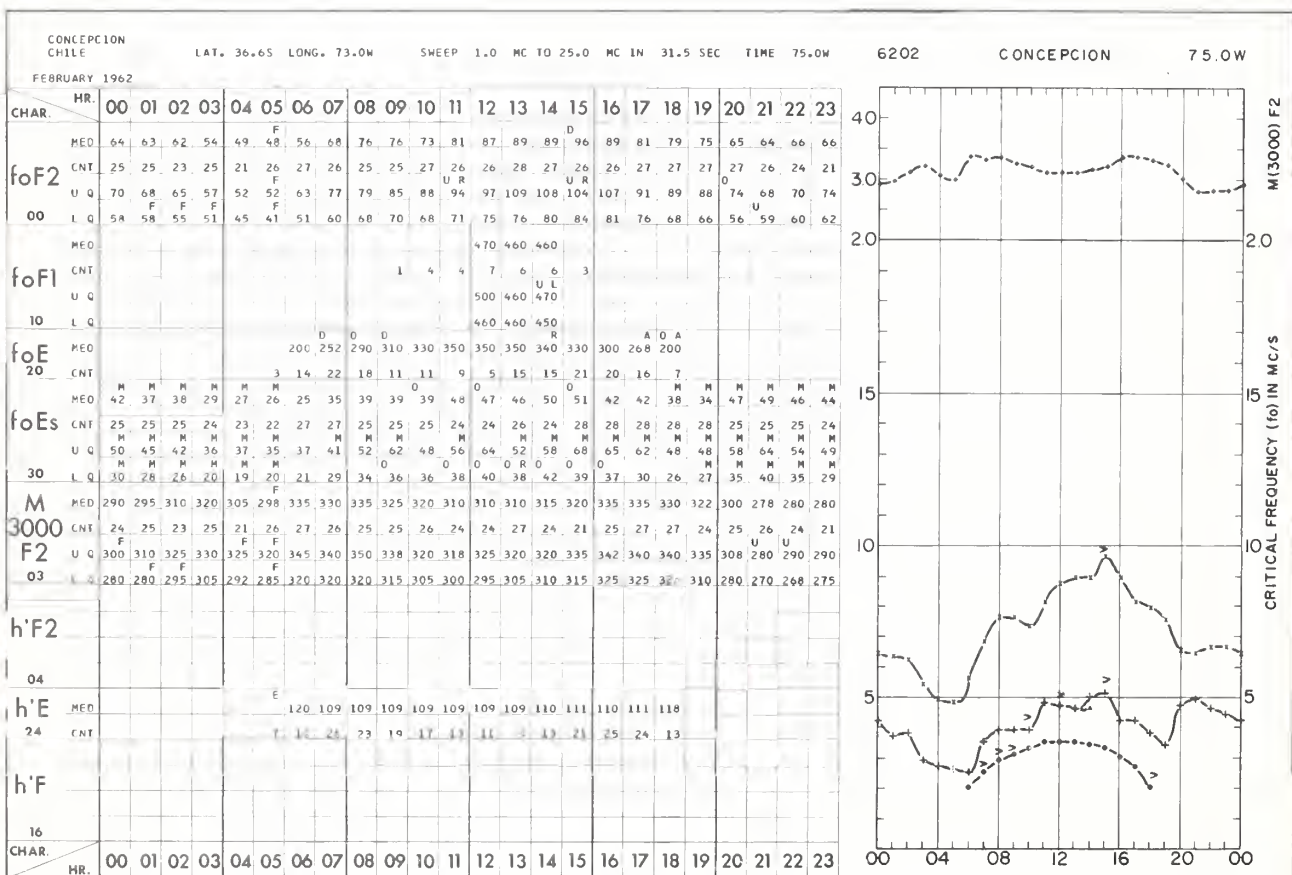
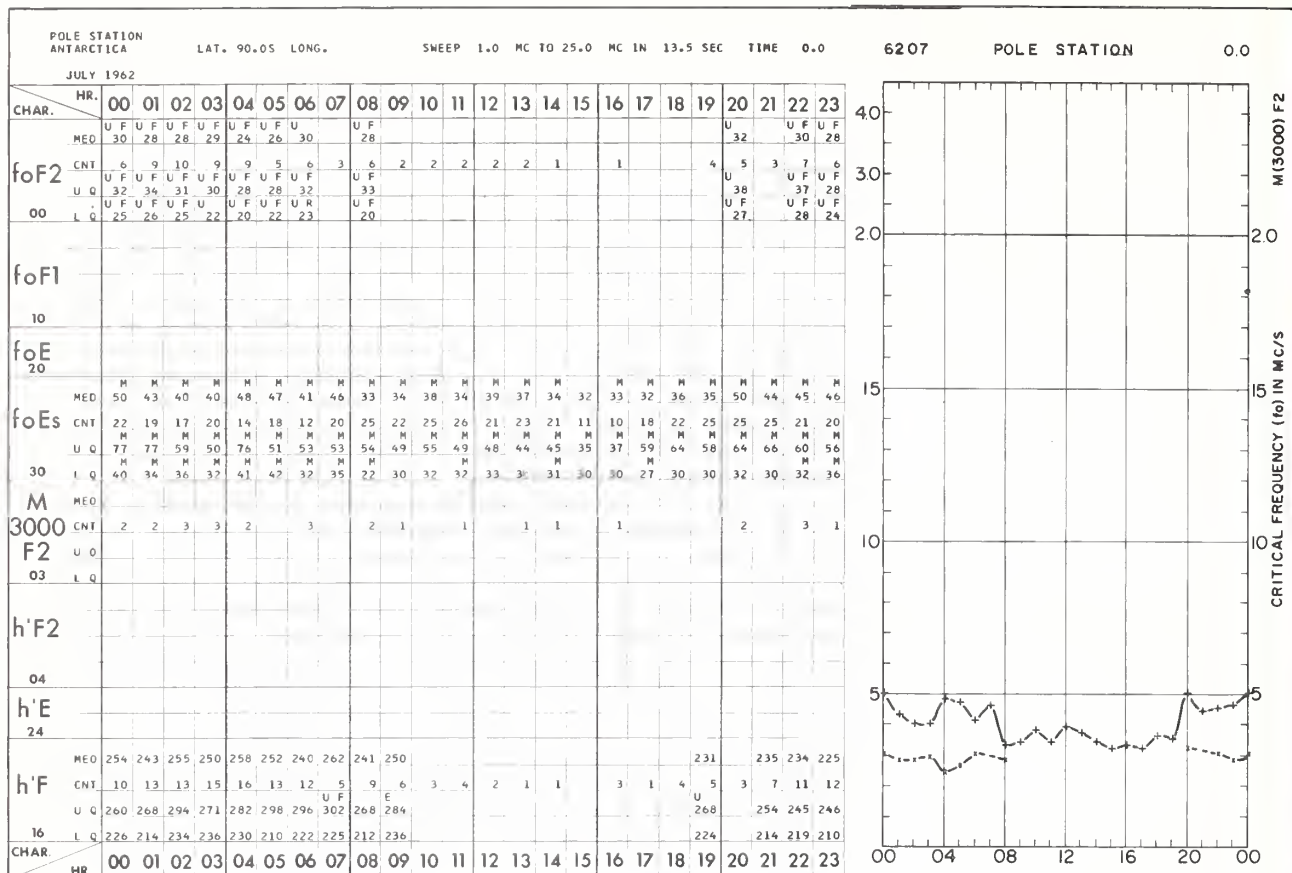












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